P90X0
Standalone System Interactive Diagnostics 6.2

Field Support Manual

PHILIPS

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Great care has been taken to ensure that the information
contained in this handbook is accurate and complete.
Should any errors or omissions be discovered or should
any user wish to make a suggestion for improving this
handbook, he is invited to send the relevant details to:

STATUS RECORD

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Standalone System Interactive Diagnostics
Field Support Manual

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PREFACE

The *Standalone System Interactive Diagnostics (SSID) User's Guide* Version 3 describes the program that tests and diagnoses system problems and how to use them. This manual assumes that you are familiar with the operating system of your host system and with the operation of the devices you want to diagnose and/or test.

The *SSID User's Guide* contains seven chapters and one appendix:

- Chapter 1 provides an introduction to SSID.

- Chapter 2 describes SSID basics, including invoking and using SSID.

- Chapter 3 describes the SSID system commands available in menu mode.

- Chapter 4 focuses on confidence, fault, board, and peripheral testing; specific board tests are described in Chapters 5 through 7.

- Chapter 5 describes CPU, memory, and miscellaneous board tests, including MVME147 and MVME393 board tests.

- Chapter 6 covers mass storage controller board tests.

- Chapter 7 describes communication controller board tests.

- Appendix A describes the command line mode commands.

Conventions Used in this Manual

The following notation conventions are used throughout this document.

bold	User input, such as commands, options and arguments to commands, variables, and the names of directories and files, appear in **bold** typeface.
italic	Names of variables to which you must assign values (e.g., *x.y*) and parenthetical comments on display screens appear in *italic* typeface.
`constant width`	System output (e.g., display screens and responses to commands) appears in `constant width` typeface.
`SA:`	This symbol indicates the SSID menu mode prompt. Your particular menu mode prompt may be different.

>	This symbol is the prompt used in command line mode, a testing environment intended for advanced users of SSID (refer to Appendix A).
\<CR>	In most cases, your typed entry is sent to the system for action when you press **\<RETURN>**. Where used, \<CR> represents the single key that performs the return function.
\<^L>	This symbol (where *L* is a letter) represents a control character. You execute control characters by pressing the \<CTRL> key and the alphabetic key simultaneously. For example, the control character \<^H> moves left on the line one space at a time, deleting characters; it is used to correct typing errors.

NOTE

The screen displays shown in this document may
vary slightly from your system's screen displays.

Much of the information contained in this manual is accessible online through the **help** system command. Refer to **help** in Chapter 3 for details.

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CHAPTER 1
INTRODUCTION

SSID Overview

SSID was derived from VMEsystest, a program that was first shipped with Motorola 1130 Series systems. VMEsystest proved to be an effective diagnostic and evaluation tool on these systems and thus was selected as the base for SSID diagnostics. SSID extends the functionality of VMEsystest by adding user-friendly menu structures with extensive predefined test scripts for factory, field, and development use.

SSID is a flexible, expandable set of system level tests and fault isolation diagnostics that execute on a VME-based system. The package is designed to serve the following four distinct end user groups:

1. *Manufacturing*: Verifies final system configuration by running the components in the actual target environment.

2. *Engineering*: Checks and verifies new designs in a particular system configuration.

3. *Field Service*: Measures performance and isolates faults in installed systems.

4. *System Integration*: The Configurable Diagnostics (CD), which is a linkable version of SSID to be released at a future date, offers a basis on which test modules for user-supplied products may be added to provide a complete system diagnostic.

The many features and utilities of SSID are designed to meet the needs of each end user group. Fault isolation is the goal of SSID, and it is assumed that faults can be isolated to a functional block by using the test package. Component level fault isolation (i.e., testing specific integrated circuits or passive components such as resistors or capacitors) is generally beyond the scope of SSID.

INTRODUCTION

SSID runs in a standalone environment; it does not interact with the operating system at any time. It can reside on a bootable floppy, tape cartridge, or within the operating system **root** file system. SSID is selected at system boot time in place of the operating system. Once booted, it has complete control over all hardware and peripherals. Remote communication capabilities are also available to allow off-site test and diagnosis via an optional internal modem.

Features

SSID possesses capabilities that set it apart from typical test software and enable it to serve a variety of applications. SSID features include:

- Tests that execute under a real-time, multi-tasking kernel to simulate the target environment in which the operating system would normally reside.

- Programs developed in C language to ensure ease of porting.

- The ability to configure test conditions to match changing hardware configurations or to pinpoint a specific fault or measurement state.

- Elaborate test environment controls for fault isolation.

- Timer functions to support system performance measurement.

- Error logger and I/O redirection capabilities for test record keeping.

Concurrent Testing

Most test and diagnostic software packages use sequential testing, i.e., one test runs to completion before the next test starts. Sequential testing is easy to use and generally provides good fault coverage. In the VME environment, individual components such as CPU boards, communication boards, or disk controller boards are often tested in this way before being integrated into the final system configuration. At this point, you can execute another set of sequential tests to verify gross functionality.

General fault coverage may be acceptable; however, subtle interactions between modules that could appear in an operating system environment may not occur or be exercised at all. SSID provides an additional form of testing to simulate these interactions while still in a controlled environment.

Besides supporting sequential testing, SSID allows concurrent testing, which better simulates the asynchronous nature of the target systems. Concurrent operation in SSID is a blend of real-time execution (interrupt or exception processing), protected sequential execution (kernel operations that help synchronize and protect shared resources), and time-slice execution (each task is allotted a fixed portion of the available CPU time). Each test module or group of modules can execute in any or all modes, limitations being established only by the individual system components. After verifying system integrity with concurrent testing, the risk of additional failures while running with the operating system is significantly reduced or eliminated.

Dynamic Test Configuration

You can accomplish dynamic or *run-time* changes to SSID in three ways:

1. Specify the desired test order from the command line.

2. Use various SSID utilities to tailor the execution of tests. For example, enable or disable concurrent test mode or select tests to run once or in a loop-continuous mode. (Refer to **setopt** in Chapter 3 or **set** in Appendix A.)

NOTE

Changing options with **set/setopt** does *not* affect the options in **confid/fault** and peripheral test scripts.

3. Use the **cf** command line utility. (Refer to **cf** in Appendix A.)

I/O Support

SSID provides the end user with a variety of I/O support capabilities. Normal operator-interface, terminal I/O is the obvious start of the I/O system. You can add new or additional device drivers to the I/O system with the CD package. You can use I/O redirection to read or write the default or standard input, output, and error output functions to any device that has a device driver installed in SSID. A basic error logger function logs and maintains a summary count of errors occurring on each device so that errors that occur during unattended testing are not lost.

SSID Requirements

To run all SSID functions, the following items are required:

HARDWARE

- A Motorola microcomputer system acting as the host system
- The host system terminal from which you invoked SSID, and is therefore the current SSID *control* terminal
- Write-enabled removable media
- Loopback cables
- Formatted disk drives (SSID 6.2 and subsequent releases do provide a diagnostic formatter when destructive testing is enabled for some drives)

SOFTWARE

- The operating system of the host system to format disk drives for drives that do not have a format program implemented in SSID
- SSID as a bootable file on the operating system tape or disk, as a bootable floppy disk, or as a tape cartridge

Table 1-1 provides a summary of SSID Tests and Diagnostics.

Table 1-1. Summary of SSID Tests and Diagnostics

TEST TYPE	APPROXIMATE TIME	LOOP-BACK CABLE	WRITE-ENABLED MEDIUM
CONFIDENCE TEST SUITES			
Quick System Check with Communication	30 sec. - 3 min.	yes	yes
Quick System Check without Communication	30 sec. - 3 min.	--	yes
Continuous Running Check with Communication	user-determined	yes	yes
System Installation Check with Communication	30 min. - 1 hour	yes	yes
Continuous Running Intensive I/O	user-determined	yes	yes
FAULT TEST SUITES			
OS System Panic	10 - 35 min.	--	yes
System Halt	10 - 35 min.	--	yes
Memory Fault	2 - 15 min.	--	--
Disk Fault	45 min. - 1 hr.	--	--
Tape Fault	1 hour	--	yes
Communication Fault	5 - 10 min.	yes	--
BOARD TESTS			
MVME13x 68020 CPU	depends on	--	--
MVME135/136 68020 CPU	test(s) chosen	no	no
MVME141 68030 CPU	"	--	--
MVME143 68030 CPU	"	no	no
MVME147/147xx Monoboard Microcomputer	"	yes	some tests
Interactive Memory Tests	"	--	--
MVME320 Wini/Floppy Controller	"	--	some tests
MVME323 ESDI Disk Drive Controller	"	--	--
MVME327 SCSI Drive Controller	"	--	some tests
MVME330 LAN Controller	"	(1)	--
MVME332/332XT 8 Port Communication Boards	"	yes	--
MVME333 WAN Controller	"	yes	--
MVME333 X.25 Controller	"	yes	--
MVME335 Async Communication Controller	"	yes	--
MVME336 Delta Link Async Communication Cntrlr	"	yes	--
MVME350 Streaming Tape Controller	"	--	some tests
MVME355 9-Track Tape Controller	"	--	some tests
MVME360 SMD Hard Disk Controller	"	--	--
MVME374 Multi-Protocol Ethernet Cntrlr	"	(2)	-
MVME393 Multi-Channel Graphics Cntrlr	"	(3)	-
MVME050 Utility Board	"	--	--

Table 1-1. Summary of SSID Tests and Diagnostics (cont'd)

TEST TYPE	LOOP-APPROXIMATE TIME	WRITE-BACK CABLE	ENABLED MEDIUM
PERIPHERAL TEST SUITES			
VME320 Winchester Drive (2)	45 min. - 1 hr.	--	--
VME360 SMD Drive	35 min. - 1 hr.	--	(4)
VME320 Floppy Drive (DESTRUCTIVE)	15 minutes	--	yes
VME350 1/4" Streaming Tape Drive (DESTRUCTIVE)	1 hour	--	yes
VME355 9-Track Tape Drive (DESTRUCTIVE)	35 min. - 1 hr.	--	yes
VME323 ESDI Drive (2)	1 hour	--	(4)
VME147/327 SCSI Tape Drive (DESTRUCTIVE)	1 hr.	--	yes
VME147/327 SCSI Disk Drive	25 - 45 min.	--	(4)
VME147/327 SCSI Floppy Drive (DESTRUCTIVE)	5 - 10 min.	--	yes

(1) The board must be connected to Ethernet coax via transceiver/tap to run external loopback test.
(2) Format must include bad track list for software bad track support.
(3) The External Uart Test requires loopback cables.
(4) Destructive tests are available, but you must use them with care.

Related Publications

It is recommended that you have the following manuals at hand for ready reference when using SSID:

- The system administrator's guide and reference manual for your host system's operating system.
- Manuals that specify the cable and port configuration for your host system.
- Manuals related to the devices that you want to diagnose and/or test.

The following publications may provide additional helpful information. You may purchase them from the Motorola Literature Distribution Center, 616 West 24th Street, Tempe, Arizona 85282; telephone (602) 994-6561.

MOTOROLA PART NUMBER	MOTOROLA MANUAL TITLE
MVME050	MVME050 System Controller Module/MVME701/MVME701A I/O Transition Module User's Manual
MVME130	MVME130/MVME131 32-Bit Microprocessor VMEmodule User's Manual
MVME130XT	MVME130XT and MVME130XT-1 Microcomputer User's Manual
MVME131XT	MVME131XT and MVME131XT-1 Microcomputer User's Manual
MVME134	MVME134 VMEmodule Microcomputer User's Manual
MVME135 MVME141	MVME135, MVME135-1, and MVME136 Multiprocessor User's Manual MVME141 32-Bit VMEbus/VSB-Based Microcomputer User's Manual
MVME143	MVME143 MPU VMEmodule User's Manual
MVME147	MVME147 VMEmodule Monoboard Microcomputer and MVME712/MVME712M Transition Module User's Manual
MVME147FW	MVME147 SCSI Firmware User's Manual
MVME204	MVME204-1/-2 Dual Ported Dynamic Memory VMEmodule User's Manual
MVME204F	MVME204-2F Dual Ported Dynamic Memory VMEmodule User's Manual
MVME224	MVME224-1/-2 4/8Mb DRAM Memory Modules User's Manual
MVME320B	MVME320B VMEbus Disk Controller Module User's Manual
MVME327A	MVME327A VMEbus to SCSI Bus Adapter And MVME717 Transition Module User's Manual
MVME327AFW	MVME327A Firmware User's Manual
MVME330	MVME330 Ethernet Controller User's Manual
MVME332	MVME332 Intelligent Communication Controller User's Manual
MVME332XT	MVME332XT Intelligent Communication Controller User's Manual
MVME333	MVME333 Intelligent Communication Controller User's Manual
MVME335	MVME335 Serial and Parallel I/O Module User's Manual
MVME336SIO	MVME336SIO Serial I/O Host Module and MVME751 Transition Module User's Manual
SYS336M16	SYS336M16 Remote Terminal Multiplexer User's Manual
MVME350	MVME350 Streaming Tape Controller VMEmodule User's Manual
MVME360	MVME360 SMD Disk Controller User's Manual
MVME374	MVME374 Multi-Protocol Ethernet Interface Module User's Manual
MVME393	MVME393 Multi-Channel Graphics Display Controller User's Manual

NOTE

Although not shown in the above list, each Motorola MCD manual publication number is suffixed with characters that represent the revision level of the document, such as /D2 (the second revision of a document).

A supplement bears the same number as the manual but has a suffix, such as /A1 (the first supplement to the document).

The following publications are available from the sources indicated:

VMERAM User Information Manual

- Provides information on the MVME205

- Available from: Clearpoint Inc., 99 South Street, Hopkinton, MA 01748

V/ESDI 4201 Panther High-performance VMEbus Enhanced Small Device Interface (ESDI) Disk Controller User's Guide

- Provides information on the MVME323

- Available from: Interphase Corporation, 2925 Merrell Road, Dallas, TX 75229-9990

V/Tape 3209 High-performance VMEbus 1/2 Inch Tape Controller User's Guide

- Provides information on the MVME355

- Available from: Interphase Corporation, 2925 Merrell Road, Dallas, TX 75229-9990

CHAPTER 2
SSID BASICS

This chapter explains how to invoke SSID and how to use its menu system for running tests and diagnostics.

Invoking SSID

To boot and execute SSID follow these steps:

STEP 1 Reset or power off the system; then power on.

STEP 2 Type **h** (halt) immediately after the following message displays:

```
        System Self Test    Rev. x.y
        FPC status
        PMMU status
```

If the second phase of System Self Test (SST) begins before you type **h**, press the BREAK key to stop SST.

STEP 3 Type **2** (Select Alternate Boot Device) in response to the following service menu:

```
        1) Continue System Start-up
        2) Select Alternate Boot Device
        3) Go to System Debugger
        4) Initiate Service Call
        5) Display System Test Errors
        6) Dump Memory to Tape
        Enter menu #:  2 <CR>   (User input shown in bold)
```

STEP 4 Choose the controller, drive, and file from which to boot SSID (refer to Software Release Guide for boot file names).

Enter Alternate Boot Device(Controller,Drive,File): *x,y,z* <CR>

where: **x** is the controller to be accessed, **y** is the drive, and **z** is the file.

2-1

2

Use Table 2-1 to determine non-SCSI boot device options and Table 2-2 to determine SCSI boot device addresses. MC68030-based processors allow mapping of logical controller numbers and physical controller numbers. To determine boot device addresses on these boards it may be necessary to execute the bug command **iot;h** to determine the correct device address. Refer to the appropriate processor debugger manual for further information on the **iot** command.

Table 2-1. Non-SCSI Boot Device Options

CONTROLLER	DRIVE	FILE
Winchester **0** = first MVME320 drive **1** = second MVME320	**0** = first Winchester **1** = second Winchester drive	**diag/test**PN*
Floppy **0** = first MVME320	**2** = first floppy drive **3** = second floppy drive	**test**PN*
Storage Module Device (SMD) **2** = first MVME360 **3** = second MVME360	**0** = first SMD drive **2** = second SMD drive	**diag/test**PN*
Streaming Tape **4** = first MVME350	**0** = streaming tape drive	**test**PN*
ESDI Disk Drive **8** = first MVME323	**0** = first ESDI drive **1** = second ESDI drive **2** = third ESDI drive **3** = fourth ESDI drive	**diag/test**PN*

* *PN* = processor number:
132 for MVME130-132-based systems, **134** for MVME134-based systems, **141** for MVME141-based systems, 143 for MVME-143-based systems.

For example, to boot SSID from the first floppy drive on an MVME132-based system, type:

      0,2,test132 <CR>

where:

0   is the first MVME320 controller

2   is the first floppy drive (device #2)

test132   is the file to be loaded

2

At this point SSID displays several messages, including the address (in hexadecimal) at which the internal program load (IPL) was loaded and the amount of memory detected by SSID.

When booting SSID from an MVME147-based system with 147BUG 1.0 using SCSI devices attached to the onboard SCSI controller, use the following boot device options. The target addresses shown assume that the drives have been addressed according to instructions provided by Motorola in Motorola installation instructions. On MVME147-based systems with 147BUG 2.0 or higher, use the **iot;h** bug command to determine drive LUN numbers for booting. Once SSID is booted, use the SCSI physical address for testing.

Table 2-2. SCSI Boot Device Addresses with 147 BUG 1.0 or 141/327A BUG

CNTRLR (target)	DRIVE	DESCRIPTION	FILE
0	0	150Mb CDC Wren III	**dlag/test147**
1	0	155Mb Micropolis 1375	**dlag/test147**
2	0	300Mb CDC Wren IV/600MB CDC Wren	**dlag/test147**
3	0	85Mb Seagate ST296N/40Mb ST157N	**dlag/test147**
4	0	Teac/Archive Tape	**test147**
5	0	Teac/Archive Tape	**test147**

STEP 5 When the service menu displays again, type **1** to continue the system self test and startup sequence.

Before the system boots from the alternate boot device, your controller, drive, and file selections display. SSID takes approximately two minutes to load.

The SSID Main Menu

Once SSID loads, an intermediate menu displays that identifies SSID and some information about the system.

```
VME System Diagnostics - Version 6.2
Thu Jul 28  16:42:03  MST 1989

System has PMMU installed.

Total memory detected = 0x00400000, (4194303 bytes)

Seg         Start            End        Size
 0         0x00000000      0x003fffff   0x00400000

Depress Return to continue.
```

This display shows the SSID version number that has been booted plus its creation date and time. It also includes displays if an MMB/C (memory management board or controller), PMMU (paged memory management unit), or no MMM was detected by SSID. The total memory detected by SSID is shown in hexadecimal and decimal. In addition, the start, end, and size of each contiguous block of memory displays.

Some systems include additional information in the display that indicate special items. For example, if an MVME147RF is the main processor board, the following message displays before the version message:

        NO LANCE detected on this board

The user is then instructed to depress <CR> to continue, which displays the SSID Main Menu:

```
*****************************************************************************
************** SYSTEM COMMANDS ******************* MENU SELECTIONS *******
*      help      remote     disperr    **     confid       bdtest      *
*      /         cmdline    version    **     fault        ptest       *
*      disphrd   clear      setopt     **                              *
*      view      slctdev    gotobug    **                              *
*****************************************************************************

Current Menu is / - "System monitor"

help                    - Using Diagnostics           (informational screens)
confid                  - Confidence Testing          (test suites)
fault                   - Test Selection by Fault      (test suites)
bdtest                  - Test by Board                (individual board tests)
ptest                   - Peripheral Testing           (test suites)
ptesti                  - Peripheral Testing continued (test suites)
cmdline                 - Command Line Operations      (operations for advanced
users)

SA:
```

Figure 2-1. SSID Main Menu

The command review block (the upper part of the menu display) provides a quick
reference to the SSID system. It is divided into **System Commands** and **Menu
Selections**. System commands are used to perform functions unrelated to
testing. You can execute a system command any time a test is not in progress by
typing its name. Table 2-3 gives a brief description of the system commands; they
are explained further in Chapter 3.

NOTE

The command review block is not shown in the
menu displays in this manual.

Table 2-3. System Commands

COMMAND	DESCRIPTION
help	Displays the help menu which gives access to online information similar to that contained in this manual.
/	Returns to the SSID Main Menu shown in Figure 2-1.
disphrd	Displays the boards whose presence is sensed by SSID.
remote	Allows dial-in to a remote terminal connected to a modem.
cmdline	Exits the menu mode to perform various tasks. NOTE: **cmdline** is intended for advanced users of SSID.
clear	Clears all system error logs and pass counters. Does not clear error logs that are *local* to the test.
disperr	Lists the accumulated error summary and the pass count.
version	Displays the current revision data for SSID.
setopt	Sets options for tests.
view	Displays the individual tests making up any confidence, fault, or peripheral suite.
slctdev	Allows the display and on-line reconfiguration of SCSI controllers and devices. **slctdev** is required only if you do not have the default SCSI devices and/or target addresses. The default SCSI device is the 150Mb CDC Wren III, target address 0. The default SCSI tape drive is the Archive streaming tape, target address 4. (Target addresses used by **slctdev** are physical SCSI addresses, not the logical addresses used by BUG).
gotobug	Allows the user to exit SSID and return to the BUG prompt (e.g., 147Bug>). At the BUG prompt, enter g<CR> to return to SSID. You can execute any bug commands, except reset. If memory locations containing code are modified, it may be necessary to reboot SSID.

You use **Menu Selections** to access the menus that prompt you for information necessary to perform the tests and diagnostics. Table 2-4 describes the menu selections. Chapter 4 discusses the **confid**, **fault**, and **ptest** menu selections; Chapter 5 through 7 cover **bdtest** menu selections.

2

Table 2-4. Menu Selections

SELECTION	DESCRIPTION
confid	Test suites that verify total system health. They are useful at initial system installation and after a major system component replacement (refer to Chapter 4).
fault	Test suites that test and diagnose specific system failures (refer to Chapter 4).
bdtest	Individual tests that verify operation of specific boards in the system. Such testing is especially valuable whenever a board is replaced (refer to Chapter 4).
ptest/ ptestl	Test suites that test and diagnose disks and tape devices attached to the system (refer to Chapter 4).

Guidelines for Using SSID

The following guidelines will assist you in using SSID:

- Press <**CR**> after every keyboard selection.

- Correct typing errors by using <**^h**> or a BACKSPACE (ASCII code, hex 08).

- Stop a display from scrolling off the screen by using <**^s**> (ASCII code, hex 13). Resume scrolling with <**^q**> (ASCII code, hex 11). Some terminals have a HOLD SCREEN function key that stops and restarts scrolling.

- Before executing any test or test suite, read the **help** item or relevant section of this manual. Remember that some floppy disk and tape tests are destructive to the medium.

- Before executing any test suite, view the individual tests making up the suite by using the **view** command described in Chapter 3.

- Access any menu by entering its name and pressing <CR>.

- When you make a selection from a **confid, fault, ptest,** or **ptesti** menu, a suite of tests is performed; each **bdtest** menu selection executes only one test.

- SSID allows you to set various test options, such as verbose mode, concurrent mode, and display-all-errors mode. Refer to *The setopt Command* in Chapter 3 for details.

2

- If a test requiring a loopback cable is executed without the cable installed, the test or diagnostic may execute improperly. If this happens, install the cable and reboot SSID.

- If a test requiring a scratch floppy disk or tape is executed without the medium installed, the test or diagnostic may execute improperly. If this happens, install the scratch medium and reboot SSID.

Terminating SSID

When stopping an SSID test or the program itself, follow the guidelines listed below:

- **Stopping a Test**
  Press the BREAK key (ASCII code, hex 0) to stop an SSID test. Any errors detected by the test or test suite before the test is stopped will NOT appear in the error log.

CAUTION

Using the BREAK key sometimes cause diagnostics to become corrupted. If this happens, reboot SSID.

- **Console Power-Off**
  Never power off or remove the console while executing SSID tests. If this happens, reboot SSID.

- **Stopping SSID**
  To exit the SSID program, power off or reset the system. No disk should be under test during power off; however, you may reset the system during a disk test.

CHAPTER 3
SYSTEM COMMANDS

System commands are used to perform functions unrelated to testing. You can execute a system command any time a test is not in progress. The system commands are listed below and described in detail in this chapter.

```
********************************************************
***************** SYSTEM COMMANDS *********************
**        help        remote        disperr        **
**        /           cmdline       version        **
**        disphrd      clear         setopt         **
**        view         slctdev       gotobug        **
********************************************************
```

The help Command

This command causes the main **help** menu to display. Once in the **help** program, you can access online information about SSID operations and all SSID tests and test suites. This manual is based on the information in the **help** program.

To access the main **help** menu, type:

> SA: **help**

The following menu displays:

```
        Main Help Menu
1) How To Use System Diagnostics
2) Confidence Testing ("confid")
3) Testing of Specific Faults ("fault")
4) Testing of Individual Boards ("bdtest")
5) Peripheral Testing ("ptest")
Enter TOPIC NUMBER or "6" to return to system test menu:
```

SYSTEM COMMANDS

The following describes each topic in the **help** menu:

1) **How To Use System Diagnostics**
   Items in this section provide general information about system commands and guidelines for using SSID menus.

2) **Confidence Testing ("confid")**
   Items in this section describe the confidence checks that verify total system health. The tests are useful at initial system installation and after a major system component replacement. Refer to Chapter 4 for details.

3) **Testing of Specific Faults ("fault")**
   Items in this section describe tests and diagnostics that deal with a specific system failure. For example, if you decide to run the OS System Panic test because you received an operating system panic message, the OS Panic item will provide you with information about the test before you run it. Refer to Chapter 4 for details.

4) **Testing of Individual Boards ("bdtest")**
   Items in this section describe tests which verify the operation of a specific board in the system. Such testing is valuable whenever you replace a board. Refer to Chapters 5 through 7 for details.

5) **Peripheral Testing ("ptest")**
   Items in this section describe test suites and diagnostics available for disks and tape devices attached to the system. Refer to Chapter 4 for details. Individual tests in the test suites can be run separately through the **bdtest** menu (refer to Chapters 5 through 7).

Information on a given topic may fill several screens. Press the <CR> key for additional help information; type p to return to a previous screen in a **help** selection; type l to return to the last menu.

Help Example

This example demonstrates how to obtain information on quick system tests.

```
SA: help <CR>
        Main Help Menu
1) How To Use System Diagnostics

2) Confidence Testing ("confid")

3) Testing of Specific Faults ("fault")

4) Testing of Individual Boards ("bdtest")

5) Peripheral Testing ("ptest")

Enter TOPIC NUMBER or "6" to return to system test menu: 2 <CR>
                (to access the Confidence Testing help menu below)

Confidence Testing ("confid")
 1) Quick System Tests   2) System Installation  3) Continuous Burn-in


Enter TOPIC NUMBER, or "4" to return to main help menu: 1 <CR>
                (to access information about quick system tests)

                        (continued)
```

3

```
                              (continued)
                 CONFIDENCE TESTS- Quick System Testing

The Quick System Tests verify that all major system components
are healthly in 30 sec. to 3 min. depending on system memory and
disk configuration.

The Quick System Tests come in two versions.  One contains comm
testing and requires a loopback cable on ports one and two of
each 331/332 comm board, a loopback cable on ports three and
four of each 333 comm board in the system.  The other Quick
System Test does not contain comm testing thus can be run
without a loopback cable.  This test requires a write enabled
tape installed in the tape drive.



Depress CR to display menu, or "p" for previous info: <CR>
                        (to return to last menu.)

Confidence Testing ("confid")
 1) Quick System Tests   2) System Installation  3) Continuous
Burn-in

Enter TOPIC NUMBER, or "4" to return to main help menu:
```

The / Command

This command returns the SSID program to the **System Monitor** (home) menu. To access the home menu, type:

    SA: /

The main SSID menu appears.

```
*************************************************************************
************** SYSTEM COMMANDS ****************** MENU SELECTIONS *******
  *    help       remote     disperr    **    confid      bdtest     *
  *    /          cmdline    version    **    fault       ptest      *
  *    disphrd    clear      setopt     **                           *
  *    view       slctdev               **                           *
*************************************************************************
Current Menu is / - "System monitor"
help                  - Using Diagnostics
confid                - Confidence Testing
fault                 - Test Selection by Fault
bdtest                - Test by Board
ptest                 - Peripheral Testing
ptesti                - Peripheral Testing continued
cmdline               - Command Line Operations

SA:
```

The disphrd Command

This command displays the boards whose presence is sensed by SSID when it probes to determine which VME boards are installed. (If a board is completely dead it may not be recognized.) The display is identical to the main **bdtest** menu.

To display the hardware in your system, type:

SA: **disphrd**

A display similar to the following appears:

```
Current Menu is /bdtest - "Tests by Board"

131.0         - VME131 68020 CPU Tests
204.0         - VME204 Computer System Memory Tests
320.0         - VME320 Disk Controller Tests
G330.0        - VME330 GSP LAN Board Test
332.1         - VME332 8 Port Comm. Board Test   (second MVME332 board)
332.0         - VME332 8 Port Comm. Board Test   (first MVME332 board)
333.0         - VME333 WAN Communications Board Test
350.0         - VME350 Streaming Tape Board Tests
355.0         - VME355 Controller/Drive Test
360.0            - VME360 SMD Controller Tests

SA:
```

The remote Command

For systems with an internal modem, this command allows you to run diagnostics at a remote terminal connected to a modem. In addition, **remote** allows connection to a remote terminal on port 2 of the host CPU transition board. Once you are connected to the remote terminal, all keyboard activity and screen displays are seen concurrently. All your keystrokes are echoed to the remote site and vice versa. Likewise, all SSID functions can be performed by you or by the individual at the remote terminal.

While connected to the remote terminal, you can choose a **Conversation Mode** which allows you to communicate via typed messages to the individual at the remote terminal. SSID ignores all activity done in **Conversation Mode**.

NOTE

The **remote** command does not currently support automatic dial-in to the Customer Response Center. If you have an internal modem and the Remote Maintenance Facility, you can access the Customer Response Center by selecting menu item 4 (**Initiate Service Call**) from the service menu shown in the *Invoking SSID* section.

To initiate the remote link, type:

    SA: remote

The following question appears:

> `Is the remote a terminal or modem (t/m)?`

If you request a remote terminal connection (**t**), the **remote** program connects you to port 2 of the host CPU transition board at 9600 baud. The terminal connection is complete when the previous SSID menu reappears. At this point all SSID functions you perform are visible on the remote terminal; likewise, the individual at the remote terminal can perform any SSID function.

If you request a remote modem connection (**m**), the following prompt appears:

> `Is modem already connected (y/n)?`
>
> | Answer **y** (yes) | Answer **n** (no) |
> |---|---|
> | `Remote link up` *(The link is at 1200 baud.)* *(See format below.)* `Depress Return to Continue` *(You are now linked to the remote modem.)* | `Enter phone number:`

`Remote link up` *(The link is at 1200 baud.)* `Depress Return to Continue` *(You are now linked to the remote modem.)* |

When you are prompted to enter the telephone number, include the following symbols as needed:

T	tone dial (default)	**,**	wait two seconds
P	pulse dial (rotary)	**=**	pause and search for another dial tone

For example:

P0,,,6023214567

where **P** indicates a pulse dial telephone and **,,,** requests a six-second delay after dialing the **0**. The delay gives the PBX time to connect your call to an outside line.

If there are problems connecting to the remote modem, you may receive one of the following messages.

```
Hanging Modem up
Retrying    (remote retries four times.)
Enter phone number:

Remote link failed:
DIALING
NO ABT  (ABT = answer back tone)

Remote link failed:
DIALING
BUSY

Remote link failed:
DIALING
NO DIAL TONE
```

To disconnect the remote link or enter *Conversation Mode*, type:

> **SA: remote**

You are then prompted:

3

Do you wish to disconnect the remote link (y/n)?	
Answer y (yes)	Answer n (no)
Depress Return to Continue *(Remote link disconnected.)*	**Do you wish "Conversation Mode"(y/n)? y<CR>** *(SSID ignores all input in "Conversation Mode".)* **Enter "<cr>." to exit Conversation Mode** *(Press the Return key followed by a period (.) when ready to exit.)*

The cmdline Command

This command causes SSID to exit the menu mode and enter another testing environment, the command line mode. (Refer to Appendix A for a discussion of the command line mode.) Once in **cmdline** mode, enter **set menu** to return to menu mode.

The clear Command

This command clears all system error logs and pass counters. Once a test fails, the **SYSTEM TEST FAIL** message displays. You must use the **clear** command to continue testing (unless you have enabled the **continue-on-error** test option as described in *The setopt Command*). This command does not clear local error logs such as those used for MVME147 SCSI errors (refer to MVME147 SCSI test descriptions for further information).

To clear error logs and pass counters, type:

```
SA: clear
Depress Return to Continue <CR>
```

3

Notice that the **clear** command does not issue a message stating that the logs and counters have been cleared. Use **disperr** before and after the **clear** command to see its effect. For example:

```
SA:  disperr <CR>
Pass-Count = 0
  /bdtest/320.0/hd.1                :error=0, fatal=1
  /bdtest/320.0/hd.0                :error=5, fatal=2
Depress Return to Continue <CR>
SA: clear <CR>
Depress Return to Continue <CR>
                    (The previous menu is displayed.)
SA:  disperr <CR>

Pass-Count = 0
Depress Return to Continue <CR>
```

The disperr Command

This command lists the accumulated error summary and the pass count.

To display all errors, type:

> SA: **disperr**

The example in the previous section (*The clear Command*) shows a **disperr** output.

The version Command

This command displays the current revision and date/time of creation for SSID as shown the following example:

```
SA:  version <CR>
Version 6.1   Jan 19  13:22:17 MST 1989
Depress Return to Continue <CR>
```

The setopt Command

This command allows you to enable or disable the test options listed below.

OPTIONS	DESCRIPTION
lc	loop-continue
le	loop-on-error
ll	loop-on-intermittent-error
vb	verbose mode
ce	continue-on-error
ae	display all errors
dp	display packet
con	concurrent mode
time	execution time
menu	prompt by menu

The following describes the variable settings:

lc loop-continue (default: disabled)
When enabled, this variable causes SSID to repeat a test or test suite continuously until the BREAK key (ASCII code, hex 0) is pressed.

le loop-on-error (default: disabled)
When enabled, this variable causes SSID to repeat a failing test until the test passes. It is useful if you want to see an error occur repeatedly.

ll loop-on-intermittent-error (default: disabled)
When enabled, this variable causes SSID to repeat a test that fails randomly.

vb verbose mode (default: enabled)
When enabled, this variable determines how much status and error information displays while tests are running. When disabled, the information about individual tests is suppressed; only the execution time and test outcome (passed or failed) displays.

ce continue-on-error (default: disabled)
When enabled, this variable causes a test to continue to run even when an error has been detected. When **ce** is disabled, SSID stops after the current test completes if an error has occurred. Enable **ce** if you want to see all possible errors in a given test suite or sequence.

ae display-all-errors (default: disabled)
When enabled, this variable permits the display of all errors that result from data comparisons during a test. If you are interested only in whether a test passes or fails, disable **ae** so that only the first data comparison error message displays.

dp display packets (default: disabled)
When enabled, this variable displays packet activity as it occurs. When disabled, no packets are displayed unless an error occurs. On the MVME147, this option is used to display SCSI packets if an error occurs during execution of the packet. (A packet is a block of data containing commands and control information and will vary in content between controllers (refer to the appropriate board information in Chapters 5 through 7.) The figure below shows a packet as it might be displayed if **dp** were enabled.

```
|cmd -p| stat _p| pkt_no |cmd |type|am|dw|pu|su|pri_addr|sec_addr|
| 01   |   ff   |00000005|2001| 02 |05|01|00|00|00000000|0000ffff|
| count  |ctrl0|ctrl1|ctrl2|comp_st  |ss|ls|rcnt|pri_sadr|sec_sadr|
|00000096|ffff |ffff |ffff |c2000000|00|00|0000|0000a4fe|00000000|
|term_cnt|stat0|stat1|stat2|
|00000000|0000 |4031 |0000 |
```

con concurrent mode (default: enabled)
When enabled, this variable allows multiple tests to be run on the current command line concurrently or in parallel. Disable **con** if you want to run a group of tests on the command line sequentially.

time display elapsed time (default: disabled)
When enabled, this variable causes the elapsed time of the test or test suite to display in the following format:

> **Execution time (hrs:min:sec.ms)** = *hrs:min:sec.ms*

This information is not shown if **time** is disabled.

menu prompt by menu (default: enabled)
This option causes SSID to return to the previous menu screen after the execution of any command, test, or test suite. Switching to command line mode automatically disables this option.

NOTE

> Most **confid**, **fault**, **ptest**, and **ptesti** test suite options are set in the test scripts themselves and are, therefore, unaffected by option settings made using **setopt**.

To change any of the preceding test options, type:

> SA: **setopt** <CR>

A display similar to the following appears.

```
SA: setopt
Setopt
Current option settings are:      (This display shows the default
settings.)
1)              lc - disabled loop-continue
2)              le - disabled loop-on-error
3)              li - disabled loop-on-intermittent-error
4)              vb - enabled verbose-mode
5)              ce - disabled continue-on-error
6)              ae - disabled display all errors
7)              dp - disabled display packet
8)             con - enabled concurrent-mode
9)            time - disabled execution-time
10)            menu - enabled prompt by menu
11)                  set all options to default setting
12)                  to exit setopt
            (This example shows how to disable the verbose mode option.)
Enter the number of the option to be changed
: 4 <CR>
     vb - enabled verbose-mode
Enter: 1 to enable or 2 to disable
2 <CR>
            (The setopt display screen reappears with verbose mode disabled.)
Enter the number of the option to be changed
: 12 <CR>      (to exit setopt.)
Depress Return to Continue <CR>
```

The view Command

The **view** command displays the individual board tests making up any confidence, fault, or peripheral test suite. Note that the tests are not run with **view**; it is a display only command.

To display any confidence suite, type:

> SA: **view confid**

3

The confidence menu displays. Enter the number of the suite you wish to view. If you select confidence test 1, a display similar to the following appears:

```
          Quick System Confidence Check with Comm.:
set +vb -ce +time;mem.0 2;131.0;320.0/hd.0 01;332-0/sp.0;350.0/tp.0
c0120c0120:

Do you wish to select another confid script for viewing?
y - reselect,  n - exit view
```

The suite displays in the same format used to specify multiple board tests. Refer to *Performing Multiple Board Tests* in Chapter 4. Testing environment options set with the **set/setopt** command do not affect options in confid/fault and peripheral tests. Refer to Appendix A.

If you want to view another confidence suite, type **y** for reselect. The confidence screen redisplays, and you can enter the number of the desired suite.

To exit the view confidence suites, type **n**; the menu present when **view confid** was entered redisplays. After exiting **view**, selecting suites causes them to run instead of display.

You may use **view** in a similar manner for fault (**view fault**) and peripheral (**view ptest, view ptesti**) suites.

view is not available for board tests.

The slctdev Command

This command displays the current SCSI configuration for all configurable controllers, and allows you to select different devices for each target address.

To display and/or change the SCSI configuration, type:

    SA: slctdev

A display similar to the following appears:

```
Select from the following:

q)  Quit slctdev program
1)  147
2)  327

Enter Selection:
```

Enter the menu number of the controller for which SCSI devices are to be configured and press <CR>. The current SCSI configuration for the selected controller displays.

```
CURRENT DEVICE CONFIGURATION
Current configuration for target[0]: System V/68 CDC III 150 MB SCSI
Current configuration for target[1]: NONE
Current configuration for target[2]: NONE
Current configuration for target[3]: NONE
Current configuration for target[4]: Archive Streaming Tape Drive
Current configuration for target[5]: NONE
Current configuration for target[6]: NONE

DEPRESS RETURN TO CONTINUE
```

Press <CR> to display the first target menu.

```
                              SYSTEM COMMANDS

    Select a controller for target 0 from the following list:

    - 512 byte sectors:  SYSTEM V/68 and V/88 hard disks and DSHD floppies
    - 256 byte sectors:  VERSAdos hard disks and SYSTEM V/66 and V/86 DSDD floppies

    1 • CDC III (150MB) 512 byte sectors      2 - Mic1375 (150MB) 512 byte sectors
    3 - CDC IV (300MB) 512 byte sectors       4 - CDC V (600MB) 512 byte sectors
    5 - Seagate (40MB) 512 byte sectors       6 - Seagate (85MB) 512 byte sectors
    7 - Swift (104MB) 512 byte sectors        8 - Swift (172MB) 512 byte sectors
    9 - CDC III (150MB) 256 byte sectors     10 - CDC IV (300MB) 256 byte sectors
    11 - Seagate (40MB) 256 byte sectors     12 - Seagate (85MB) 256 byte sectors
    13 - 655KB 5.25" Floppy 256 byte sectors 14 - 1.2MB 5.25" Floppy 512 byte sectors
    15 - 750KB 3.5" Floppy 512 byte sectors  16 - 1.5MB 3.5" Floppy 512 byte sectors
    17 - 2.9MB 3.5" Floppy 512 byte sectors  18 - 1.2MB 5.25" Floppy 256 byte sectors
    19 - ARCHIVE or TEAC Streamer            20 - KENNEDY 9 Track Tape 96I0
    21 - EXABYTE 2GB Tape

    r - no controller            n - go to next controller
    b - start over at controller 0    q - quit selection program
```

The display lists all possible devices for target address 0. The entry number followed by an asterisk (*) specifies the currently selected device for the target address on the screen. To select a different device for the displayed target address, type the number associated with the desired device and press <CR>. The selections for the next target address then displays. If you do not want to change the device for the target address you are currently viewing, type **n** or <CR> to go to the next target address.

To remove a configured device from a SCSI target address enter **r**. Enter **b** to restart the configuration for this controller at SCSI target 0. Enter **q** to exit configuration for this controller.

After displaying the device options for all target addresses or typing **q** (quit), the CURRENT DEVICE CONFIGURATION displays again, showing the changes made with **slctdev**; press <CR> to redisplay the **slctdev** menu. Select another controller to configure or enter **q** to exit the **slctdev** program. If **slctdev** was invoked on a system without configurable SCSI devices, the following message displays:

```
There is no selectable SCSI in this system.
```

All SSID tests now reflect the changes made with **slctdev**. Note, however, that the **ptest** scripts work only if target addresses 0, 1, 2, 3, and 6 are disk drives, and target addresses 4 and 5 are tape drives.

The gotobug Command

The **gotobug** Command returns the user to the BUG prompt (e.g., 147BUG>) to execute bug commands. As long as a reset has not been executed, you can return to SSID at the point where **gotobug** was executed by entering **g**<CR>. If memory locations containing code were modified, it may be necessary to reboot SSID.

CHAPTER 4

CONFIDENCE, FAULT, BOARD, AND PERIPHERAL TESTING

Confidence Testing

Confidence testing verifies total system health by running a dynamically configured suite of tests. Before performing a confidence test, read this chapter or read the **help** screens related to confidence testing. Both sources describe the various confidence test suite available through the **confid** menu. You can display the individual tests making up the suites with the **view** command.

To access the **confid** menu, type:

> SA: **confid**

The following display appears:

```
Current Menu is /confid - "Confidence Testing"

1              - Quick System Confidence Check with Comm.
2              - Quick System Confidence Check without Comm.
3              - Continuous Running Confidence Check with Comm.
4              - System Installation Confidence Check with Comm.
5              - Continuous Running Intensive I/O check with Comm.

  (Tests 1 through 5 require write-enabled tapes installed in all tape drives attached to the system.)
                    (Tests 1, 3, 4, and 5 require loopback cables.)

SA:
```

Quick System Confidence Checks

The Quick System Confidence Checks (menu selections 1 and 2) verify that all major system components are healthly. The tests take from 30 seconds to 3 minutes depending on system memory and disk configuration.

There are two types of Quick System Confidence Checks. The first type tests the system with communication boards connected. To run this test suite, loopback cables are required on ports 1 and 2 of each MVME331/MVME332 or MVME332XT communication board on ports 3 and 5 of each MVME333 WAN communications board, on ports 1 and 3 of each MVME333 X.25 communication board, on all ports of each MVME335 communication board, and on all 16 ports of the first cluster controller attached to each MVME336 board.

Connect the loopback cables as follows:

```
MVME331/MVME332 :   SP1 <------> SP2

     MVME332XT :   SP1 <------> SP2

   MVME333 WAN :   SP3 <------> SP5

  MVME333 X.25 :   SP1 <------> SP3

      MVME335 :   SP1 <------> SP2
                   SP3 <------> SP4

      MVME336 :   Individual Port Loopbacks
```

Figure 4-1 shows the proper pin out for the loopback cables.

Figure 7-3 shows the proper pin out for MVME336 loopback cables.

The second type of Quick System Test does not include communication testing and can thus be run without loopback cables.

Both Quick System Confidence Checks require write-enabled tapes installed in all tape drives attached to the system.

```
 Male DB-25                               Male DB-25
 connector                                connector
   pin #         (cable length 3 inches)     pin #

 (Tx)    2     <-------------------------->   3  (Rx)
 (Rx)    3     <-------------------------->   2  (Tx)
 (RTS)   4     <-------------------------->   5  (CTS)
 (CTS)   5     <-------------------------->   4  (RTS)
 (DCD)   8     <-------------------------->  20  (DTR)
 (DTR)  20     <-------------------------->   8  (DCD)
```

Figure 4-1. 25 Pin Loopback Cable Pin Out

Continuous Running Confidence Check and Continuous Running Intensive I/O Check

This confidence check (also known as Continuous Burn-In) allows you to observe what happens to the system after many hours of continuous use. It is designed to rerun a specific set of tests until the BREAK key is pressed. Loopback cables are required on all port pairs of all MVME331, MVME332, MVME332XT on ports 3 and 5 of each MVME333 WAN communications board, on ports 1 and 3 of each MVME333 X.25 communication board, on all ports of each MVME335 communication board, and on all 16 ports of the first cluster controller attached to each MVME336 board.

Connect the loopback cables as follows:

```
MVME331/MVME332/MVME332XT :   SP7 <------> SP2
                              SP5 <------> SP6
                              SP3 <------> SP4
                              SP1 <------> SP2
            MVME333 WAN:      SP3 <------> SP5
            MVME333 X.25:     SP1 <------> SP3
            MVME335:          SP1 <------> SP2
                              SP3 <------> SP4
            MVME336:          Individual Port Loopbacks
```

Figure 4-1 shows the proper pin out for the loopback cables.

Figure 7-3 shows the proper pin out for the MVME336 loopback cables.

System Installation Confidence Check

You can run this confidence test after system installation to verify the total System, including communication. The test takes 30 minutes to one hour depending on system memory and disk configuration. Loopback cables are required on ports 1 and 2 of each MVME331/MVME332/mvme332XT communication board, on ports 3 and 5 of each MVME333 WAN communications board, on ports 1 and 3 of each MVME333 X.25 communications board, on all ports of each MVME335 communications board and on all 16 ports of the first cluster controller attached to each MVME336 board.

```
        MVME331/MVME332 :   SP1 <------> SP2
             MVME332XT :   SP7 <------> SP8
                          SP5 <------> SP6
                          SP3 <------> SP4
                          SP1 <------> SP2
          MVME333 WAN :   SP3 <------> SP5
          MVME333 X.25 :  SP1 <------> SP3
              MVME335 :   SP1 <------> SP2
                          SP3 <------> SP4
              MVME336 :   Individual Port Loopbacks
```

Figure 4-1 shows the proper pin out for the loopback cables.

Fault Testing

Fault testing checks and diagnoses specific system failures by running a dynamically configured suite of tests. Before performing a fault test, read this chapter or read the **help** screens related to fault testing. Both sources describe the various fault test suites available through the **fault** menu. The individual tests making up the suites may be displayed with the **view** command.

The **fault** menu contains test suites used to diagnose specific system failures. These suites test the requested category intensively and check the interaction between other related components in the system. For example, if the operating system reports a memory fault, run the memory fault test. This test intensively tests system memory and checks the interaction with disk and CPU operations.

To access the **fault** menu, type:

SA: fault

The following display appears:

```
Current Menu is /fault - "Test Selection by Fault"
1               - Test to be run for OS System Panic
2               - Test to be run for System Halt
3               - Memory Fault Test
4               - Disk Fault Test
5               - Tape Fault Test
6               - Communication Fault Test

   (Tests 1 and 5 require write-enabled tapes installed in all tape drives attached to the system.)
SA:
```

OS System Panic

Run this test suite if an operating system panic is reported. The test suite performs an intensive memory test with short disk, tape, and CPU tests, ensuring complete system test. You must install write-enabled in all tape drives attached to the system. In a minimal system configuration the tests take approximately 35 minutes.

NOTE

No communication board or communication line testing is performed.

The following display shows a sample OS System Panic test sequence that is initiated by typing the following in response to the **fault** menu shown above.

    SA: **1 <CR>**

```
/bdtest/131.0        1)interrupter        ................starts
/bdtest/131.0        1)interrupter        ................passed
       .                    .                             .
       .                    .                             .
       .                    .                             .
       .                    .                             .
/bdtest/204.0/mem.0  9)Long AA/55 Pattern ................starts
/bdtest/204.0/mem.0  9)Long AA/55 Pattern ................passed

PASS-0, FATAL-000, ERROR-000, 0:02:50.0  /bdtest/204.0/mem.0 : running

Execution time (hrs:min:sec.ms) = 0:30:04.180
*** SYSTEM TEST PASSED ***
Depress Return to Continue <CR>
(Press <CR> to return to the main fault menu.)
```

System Halt

Run this test suite if the system-fail LED (light emitting diode) on the CPU board is lit, or if the system stopped with no error indication.

The test suite performs intensive memory tests with short disk, tape, and CPU tests, ensuring complete system test coverage. You must install write-enabled tapes in all tape drives attached to the system. In a minimal system configuration the tests take approximately 35 minutes.

NOTE

No communication board or communication line testing is performed.

Memory Fault Test

Run the memory fault test if an operating system panic message about memory appears. The test suite determines if there is a problem with the RAM chips, VMEbus, VSBbus, ECC logic, or parity logic.

NOTE

You must perform all SST tests to correctly test *all* memory.

Disk Fault Test

Run this test suite if any type of disk fault is reported. The tests ensure complete system test coverage by performing intensive disk testing on the first disk drive of every disk controller in the system, as well as short memory and CPU testing. In a minimal system configuration, the tests take approximately one hour.

Tape Fault Test

Run this test suite if any type of tape fault is reported. The tests ensure complete system test coverage by performing intensive tape testing on the first tape drive on every tape controller in the system, as well as short disk, memory and CPU testing. You must install write-enabled tapes in all tape drives attached to the system. In a minimal system configuration, the tests take about one hour.

Communication Fault Test

Run this test suite if any type of communication fault is reported. The test suite automatically tests all properly configured communication boards in the system.

The test suite performs the following tests on the first port pair (1&2) on each MVME332/MVME331 communication board:

```
0)   ext loop back
1)   single char loop back
2)   break detection
3)   abort read
4)   abort write/read
5)   echo
6)   full duplex
7)   overrun
8)   parity error
9)   hw flow control
```

Loopback cables are required on the first port pair to run this test suite. See Figure 4-1 for the proper pin out of the loopback cables.

If the port pair in error is not the first port pair, you can still test it through the **bdtest** menu. Find the appropriate board test menu under **bdtest** (for example, **332.0/sp.2**) and specify the test sequence as follows:

    `SA: 0123456789`

For additional information, refer to the *MVME332 and MVME331 Asynchronous Communications Controller* in Chapter 7.

If the system contains an MVME332XT board, the first port pair (1 & 2) are tested as follows:

```
1)   open port a        a) DCD a -> b
2)   open port b        b) DCD b -> a
3)   loopback a -> b    c) baud rate a -> b
4)   loopback b -> a    d) baud rate b -> a
5)   full duplex        e) parity a -> b
6)   event a -> b       f) parity b -> a
7)   event b -> a       g) frame a -> b
8)   break a -> b       h) frame b -> a
9)   break b -> a       i) HW flow ctl a -> b
                        j) HW flow ctl b -> a
```

Loopback cables are required on the first port pair to run this test suite. See Figure 4-1 for the proper pin out of the loopback cables.

For additional information, refer to *MVME332XT Asynchronous Communications Controller* in Chapter 7.

If the system contains an MVME333 WAN board, port pair 3 and 5 are tested; if the system contains an MVME333 X.25 board, port pair 1 and 3 are tested. In either case, the following tests are run:

```
0)   hardware flow control
1)   single char external loopback
2)   break detection
3)   parity error
```

Loopback cables are required on port pair 3 and 5 to run this test suite on an MVME333 WAN board. Loopback cables are required on port pair 1 and 3 to run this test suite on an MVME333 X.25 board. See Figure 4-1 for the proper pin out of the loopback cables.

Refer to *MVME333 Wide Area Network Controller* and *MVME333 X.25 Controller* in Chapter 7 for information on these tests.

If the system contains a G330 or T330 board, the following tests are performed:

    0) **LANCE CSR**
    1) **LANCE Init**
    2) **LANCE Internal Loopback**

Refer to *MVME330 Local Area Network Controller* in Chapter 7 for information on these tests.

If the system contains an MVME335 communications board, the following tests are performed:

    0) **resisters**
    1) **internal-loop**
    2) **baud rate**
    3) **parity**
    4) **external-loop**
    5) **rx intr**
    6) **tx intr**
    7) **interface intr**
    8) **frame error**

Loopback cables are required on all port pairs to run this test suite. See Figure 4-1 for proper pin out of the loopback cables.

Refer to *MVME335 Asynchronous Communications Controller* in Chapter 7 for information on these tests.

If the system contains an MVME336 S10/MUX board, the following tests are performed:

xpc.0

O) XPC DMA

xp.0

C) cluster confidence
O) internal loopback
1) force break
2) external loopback
3) force framing error
4) modem status change
5) force parity error

s1omem

O) zeros
1) ones
5) 5555's
a) AAAA's
d) address

Loopback cables are required on all ports to run this test suite. See Figure 7-3 for proper cabling of the loopback.

Refer to *MVME336 DeltaLink Async Comm Controller* in Chapter 7 for information on these tests.

Board Testing

Board testing verifies the operation of a specific board in the system. Before performing a board test, read the section containing information about the board you plan to test or read the **help** screens related to board testing. Both sources describe the various board tests available through the **bdtest** menu. The **view** command is not available for board tests, although it appears in the menus on the screens.

To access the **bdtest** menu, type:

SA: **bdtest**

A display similar to the following appears, showing all the boards in your system recognized by SSID:

```
Current Menu is /bdtest - "Tests by Board"
131.0      - VME131 68020 CPU Tests
mem.0      - Memory Test
320.0      - VME320 Disk Controller Tests
G330.0     - VME330 GSP LAN Board Test
332.1      - VME332 8 Port Comm. Board Test    (second MVME332 board)
332.0      - VME332 8 Port Comm. Board Test    (first MVME332 board)
333.0      - VME333 WAN Comm. Board Test
x333.0     - VME333 X.25 Comm. Board Test
350.0      - VME350 Streaming Tape Board Tests
355.0      - VME355 Controller/Drive Test
360.0      - VME360 SMD Controller Tests
SA:
```

Figure 4-2. bdtest Main Menu

The **bdtest** Main Menu varies from system to system, displaying those boards that SSID has found in the system. SSID finds the boards during the boot sequence when it probes the VMEbus for each board in the system. If a board is completely dead, it does not appear in the menu. If a board is known to be in the system but is not displayed in the **bdtest** menu, check for proper board and backplane strapping and proper board seating. If the board is still not displayed, replace it.

It is possible to configure the SSID menu selections so that you can access menus for boards that are not actually in the system. Refer to **cf** in Appendix A for details on how to change the board configuration.

To perform specific tests on an individual board, type the board number as displayed in the **bdtest** Main Menu. If you have more than one board of the same type, the first board in the series is designated *board_number*.0, the second *board_number*.1, the third *board_number*.2, e.g., **332.0, 332.1, 332.2**. Notice that these boards are listed in the menus in reverse order; the last board in the series is shown first (see Figure 4-2).

After choosing the board to be tested from the **bdtest** Main Menu, you may go through several menu levels before reaching the test selection menu. For example, if you type the following, the **VME320 Disk Controller Tests** menu displays:

     SA: 320.0

```
Current Menu is /bdtest/320.0 - "VME320 Disk Controller Tests"
hd.1                 - Winchester Disk
hd.0                 - Winchester Disk
fd.1                 - Floppy Disk
fd.0                 - Floppy Disk
SA:
```

The test selection menu appears only after one of the four menu items is selected. Typing the following brings up the Winchester disk test selection menu:

     SA: hd.0

```
Selections for Test "Winchester Disk"
     0) Recalibrate
     1) Quick confidence read
     2) Read entire OS disk
     3) Random read OS disk
     4) Pingpong read OS disk
     d) Display OS bad tracks
SA:
```

Once a specific test starts, its progress and status display on the screen. If an error occurs, error information appears followed by a fail message. After a sequence of tests is run, a SYSTEM TEST PASS or SYSTEM TEST FAIL message displays. If the tests and their status scroll off the screen, use **disperr** to review any failures.

NOTE

Once a test fails, the SYSTEM TEST FAIL message displays. Type the system command **clear** to continue testing.

Performing Multiple Board Tests

Unlike the **confid, fault, ptest,** and **ptesti** menus that display test suites, the **bdtest** menus display individual tests. Choosing a test from a **bdtest** menu causes only a single test to be performed. However, you can specify multiple tests; type each test identifier (the number or letter preceding the test name) without spaces and press <CR>.

If, for example, the current menu is the **hd.0** test selection menu shown above, you can type the following to run both the Recalibrate and Quick confidence read tests:

SA: **01** <CR>   *(no space between test numbers)*

Just as you can specify multiple tests on a single command line, you can also specify tests from other **bdtest** menus with tests from the current menu on a single command line. When using this feature of SSID, separate the test groups with a semicolon (;) and include the test directory of the other **bdtest**. For example, assume that **hd.0** is still the current menu. If you type the following command:

SA: **01;esdi.0 01234** <CR>
(a semicolon between test groups; a space between esdi.0 and 01234)

SSID will run the Recalibrate and Quick confidence read tests from the **hd.0** menu followed by the ESDI controller tests, 0 through 4, on the first ESDI controller. The section *MVME323 ESDI Disk Drive Controller* later in this chapter describes these tests and shows the test selection menu. Notice that it is not necessary to identify the full path name of the test from the other menu (i.e., **/bdtest/323.0/esdi.0**).

As another example, suppose you want to run the interrupter test on the MVME131.0 board (see the MVME131.0 test selection menu below) in addition to tests **4** and **d** from the current **hd.0** menu, the command line would be:

SA: **4d;131.0 1** <CR>
(a semicolon between test groups; a space between 131.0 and 1.)

The remaining chapters explain the tests available in **bdtest** and show the test selection menus. Use this information as a reference if you decide to run multiple **bdtest** options from a single command line.

Peripheral Testing

4

Peripheral testing verifies the operation of system peripherals by running a suite of tests. Before performing a peripheral test suite, read this chapter or read the **help** screens related to peripheral testing. Both sources describe the various peripheral test suites available through the **ptest** and **ptesti** menus. The **ptest** menu displays the first 12 peripheral tests available. The **ptesti** menu displays the tests numbered 13 through 24 (if there are that many available). The individual tests making up the suites may be displayed with the **view ptest** and **view ptesti** commands.

To access the **ptest** menu, type:

    SA: ptest

A display similar to the following appears:

```
Current Menu is /ptest - "Peripheral Testing"
1         - 147 SCSI LUN 0,0 Test
2         - 147 SCSI LUN 1,0 Test
3         - 147 SCSI LUN 2,0 Test
4         - 147 SCSI LUN 3,0 Test
5         - 147 SCSI LUN 4,0 Test
6         - 147 SCSI LUN 5,0 Test
7         - 147 SCSI LUN 6,0 Test
8         - VME320 Winchester Drive 0,0 Test
9         - VME320 Winchester Drive 0,1 Test
10        - VME320 Winchester Drive 1,0 Test
11        - VME320 Winchester Drive 1,1 Test
12        - VME320 Floppy Drive 0,2 Test (DESTRUCTIVE)
ptesti    - Next menu. (displays additional drive test suites such as ESDI drive tests.)
SA:
```

Figure 4-3. ptest Main Menu

The drives listed in the **ptest** and **ptesti** menus are numbered using a *controller,drive* or *target,drive* (for SCSI) logical unit numbering scheme. Table 4-1 summarizes the numbering scheme.

Table 4-1. Logical Unit Numbers

LUN CONTROLLER,DRIVE	DEVICE CONTROLLER,DRIVE
0,0	1st MVME320,1st Winchester
0,1	1st MVME320,2nd Winchester
0,2	1st MVME320,1st Floppy
0,3	1st MVME320,2nd Floppy
1,0	2nd MVME320,1st Winchester
1,1	2nd MVME320,2nd Winchester
2,0	1st MVME360,1st SMD
2,2	1st MVME360,2nd SMD
3,0	2nd MVME360,1st SMD
3,2	2nd MVME360,2nd SMD
4,0	1st MVME350,1st Streaming Tape
6,0	1st MVME355,1st 9-Track
8,0	1st MVME323,1st ESDI
8,1	1st MVME323,2nd ESDI
8,2	1st MVME323,3rd ESDI
8,3	1st MVME323,4th ESDI
MVME147/MVME327 SCSI LUN TARGET,DRIVE	**DEVICE TARGET,DRIVE PHYSICAL ADDRESSES**
0,0	SCSI target 0, drive 0
1,0	SCSI target 1, drive 0
2,0	SCSI target 2, drive 0
3,0	SCSI target 3, drive 0
4,0	SCSI target 4, drive 0
5,0	SCSI target 5, drive 0
6,0	SCSI target 6, drive 0

VME320 Winchester Drive Test Suite

The Winchester drive test suite performs a series of nondestructive read-only tests. To run these tests, you must format the disk drives with an operating system format that includes the bad track list for software bad track support. All read tests in the suite check the bad track list for the current track before performing the read operation. If the current track is found in the bad track list, the current track is not read, and the test continues to the next track.

Choose the **ptest** menu item that corresponds to the controller and Winchester drive you want to test. The test suite runs in the following order:

```
0)  Recalibrate
1)  Quick confidence read
2)  Read entire OS disk
3)  Random read OS disk
4)  Pingpong read OS disk
```

To run individual tests in this suite or for a description of the tests, refer to *Winchester Disk Tests* in Chapter 6.

VME360 SMD Drive Test Suite

This test suite performs nondestructive read-only tests. The SMD drives to be tested must be initialized (formatted or have an operating system file system on them). They can be formatted with or without alternate track mapping. The tests automatically handle the alternate tracks.

Choose the **ptest** menu item that corresponds to the controller and SMD drive you want to test. The test suite runs in the following order:

```
0)  Recalibrate
1)  Confidence test
2)  Read entire Disk
3)  Random read Disk
4)  Ping-Pong read Disk
```

To run individual tests in this suite, refer to *MVME360 SMD Hard Disk Controller* in Chapter 6. The tests are described in *Winchester Disk Tests* also in Chapter 6.

VME320 Floppy Drive Test Suite

> ### CAUTION
>
> **The Floppy Drive Test Suite performs tests that destroy data on the floppy disk!**

All floppy disks used for the test suite must be formatted using the operating system. The first track is formatted by the operating system to single density; it is, therefore, not used in any of the floppy disk tests.

Before starting this test suite, insert a write-enabled, scratch floppy disk into the floppy disk drive. Choose the **ptest** menu item that corresponds to the controller and floppy drive you want to test. The test suite runs in the following order:

```
O)  Recalibrate
p)  Partial W/R DESTRUCTIVE
4)  Pingpong read Disk
3)  Random read Disk
```

To run individual tests in this suite or for a description of the tests, refer to *Floppy Disk Tests* in Chapter 6.

VME350 1/4-Inch Streaming Tape Drive Test Suite

```
┌─────────────────────────────────────────────┐
│                                             │
│                 CAUTION                      │
│                                             │
│   The 1/4-Inch Streaming Tape Drive Test    │
│   Suite performs tests that destroy data    │
│   on the tape!                              │
│                                             │
└─────────────────────────────────────────────┘
```

Before starting this test suite, insert a write-enabled, scratch 1/4-inch streaming tape into the tape drive. Choose the **ptest** menu item that corresponds to the 1/4-inch Streaming Tape Drive Test. The test suite runs in the following order:

```
O)  Init
r)  Retension
t)  Write EOT
O)  Init
v)  Read EOT
O)  Init
```

To run individual tests in this suite or for a description of the tests, refer to *MVME350 Streaming Tape Controller* in Chapter 6.

VME355 9-Track Tape Drive Test Suite

```
CAUTION

The 9-Track Tape Drive Test Suite performs tests
that destroy data on the tape!
```

Before starting this test suite, load a write-enabled, scratch 9-track tape into the tape drive. Choose the **ptest** menu item that corresponds to the 9-Track Tape Drive Test. The test suite runs in the following order:

```
0) Reset/Initialization
1) Drive Status
8) Rewind to Load Point
6) Write/Read to EOT
8) Rewind to Load Point
```

To run individual tests in this suite and for a description of the tests, refer to *MVME355 9-Track 1/2-inch Tape Controller* in Chapter 6.

VME323 ESDI Disk Drive Test Suite

This test suite performs nondestructive read-only tests. The ESDI drives to be tested must be initialized (formatted or have an operating system file system on them). They can be formatted with or without alternate track mapping; the tests automatically handle the alternate tracks.

Choose the **ptesti** menu item that corresponds to the ESDI drive you want to test. The test suite runs in the following order:

```
0) Recalibrate
1) Confidence test
2) Read entire Disk
3) Random read Disk
4) Ping-Pong read Disk
```

To run individual tests in this suite, refer to *MVME323 ESDI Disk Drive Controller* in Chapter 6. For a description of these tests, refer to *Winchester Disk Tests* also in Chapter 6.

VME147/VME327 SCSI Tape Drive Test Suite

```
                        CAUTION

    The SCSI Tape Drive Test Suite performs tests
    that destroy data on the tape!
```

4

Before starting this test suite, insert a write-enabled, scratch QIC streaming tape into the tape drive. Choose the **ptest** menu item that corresponds to the SCSI Tape Test. The test suite runs in the following order for VME327:

```
O)  Init
r)  Retension
t)  Write EOT
O)  Init
v)  Read EOT
O)  Init
```

The test suite runs in the following order for VME147:

```
O)  Init
r)  Retension
w)  Write/Read EOT
O)  Init
```

To run individual tests in this suite or for a description of the tests, refer to SCSI tape tests in *MVME147 CPU* in Chapter 5.

VME147/VME327 SCSI Hard Disk Drive Test Suite

Choose the **ptest** menu item that corresponds to the SCSI Hard Disk Test. The test suite runs in the following order:

```
O)  Recalibrate
1)  Confidence test
2)  Read entire Disk
3)  Random read Disk
4)  Ping-Pong read Disk
```

To run individual tests in this suite or for a description of the tests, refer to the SCSI hard disk tests in Chapter 5, *MVME147 CPU*.

VME147/VME327 SCSI Floppy Drive Test Suite

You can format all floppy disks used for the test suite using the operating system. The first track is formatted by the operating system to single density; it is, therefore, not used in any of the floppy disk tests.

Before starting this test suite, insert a write-enabled, scratch floppy disk into the floppy drive. Choose the **ptest** menu item that corresponds to the SCSI Floppy Drive Test. The test suite runs in the following order:

```
0) Recalibrate
1) Confidence test
2) Read entire Disk
3) Random read Disk
4) Ping-Pong read Disk
```

To run individual tests in this suite or for a description of the tests, refer to the SCSI hard disk and floppy drive tests in Chapter 5, *MVME147 CPU*.

NOTE

Currently, there are no floppy disk peripheral tests for the VME327. These tests will be supported in a future release.

CHAPTER 5

CPU, MEMORY, AND MISC. CONTROLLER BOARD TESTS

This chapter describes the board tests available for CPU and memory boards, as well as miscellaneous boards, such as graphics and utility boards. Each section describes the tests available for a particular controller board, the board's test configuration, and, in some cases, the error codes associated with the board. For an introduction to board testing, refer to *Board Testing* in Chapter 4.

MVME131XX/MVME132XX and MVME134 CPU

Two tests are available to test the MVME131XT CPU and one for the MVME134 and MVME135/MVME136 CPUs.

To access the MVME131XT CPU tests, type:

> **SA: 131.0 <CR>**

To access the MVME134 CPU test, type:

> **SA: 134.0 <CR>**

To access the MVME135/MVME136 CPU test, type:

> **SA: 136.0 <CR>**

The following display appears for the MVME131XT and a similar one for the MVME134 and MVME135/MVME136:

```
**************************************************************************
************** SYSTEM COMMANDS ****************** MENU SELECTIONS *******
*       help      remote     disperr   **      confid       bdtest     *
*       /         cmdline    version   **      fault        ptest      *
*       disphrd   clear      setopt    **                              *
*       view      slctdev              **                              *
**************************************************************************
Selection for Test "VME131 68020 CPU Tests"

    0) Enable MMB    (Do NOT use this option with Version 3.1 or earlier!)
                     (MMU on MVME134)

    1) interrupter   (Not available for the MVME134 or MVME135/MVME136)

SA:
```

For the MVME131XT, the CPU, Cache, and MMB three-board set is extensively tested at power-on and system reset. The `Enable MMB` and `interrupter` options are used to enhance the interactive testing of other system components.

For the MVME134 and MVME135/MVME136 CPUs, only the `Enable MMU` test is available:

O) **Enable MMB**
Do not use this option with SSID version 3.1 or earlier because it can cause other tests to run incorrectly or not at all. If the MMB (or the MMU on the MVME134) is enabled, it can only be disabled by resetting the system and rebooting SSID.

1) **interrupter**
This option enables and generates all seven levels of software interrupts on the board.

MVME141 CPU

Two tests are available for testing the MVME141 CPU and one for the MVME143 CPU.

To access the MVME141 CPU tests, type:

> **SA: 141.0 <CR>**

To access the MVME143 CPU test, type:

> **SA: 143.0 <CR>**

A display similar to the following appears:

```
*************************************************************************
************** SYSTEM COMMANDS ****************** MENU SELECTIONS *******
*     help      remote     disperr    **     confid       bdtest     *
*     /         cmdline    version    **     fault        ptest      *
*     disphrd   clear      setopt     **                             *
*     view      slctdev               **                             *
*************************************************************************
Selection for Test "VME141 68030 CPU Tests"

     O) Enable MMU
     1) interrupter    (not available on the MVME143)

SA:
```

For the MVME141, the CPU, Cache, and MMU board set is extensively tested at power-on and system reset. The **Enable MMU** and **interrupter** options are used to enhance the interactive testing of other system components.

For the MVME143 CPU, only the **Enable MMU** test is available:

0) **Enable MMU**
   This option turns on the Memory Management Unit.

1) **interrupter**
   This option enables and generates four levels (1, 2, 4, 5) of software interrupts on the board.

MVME147 Monoboard Microcomputer

The following tests are available for the MVME147 series of Monoboard Microcomputers: LANCE tests (for boards that contain a LANCE chip), Serial Port tests, Enable MMU, Line Printer Test, SCSI tape tests, SCSI hard disk/floppy tests, and VMEchip Interrupter tests.

The SCSI tape tests verify SCSI tape controller operation by performing write and read tests on the SCSI tape drives.

The SCSI hard disk/floppy tests verify SCSI disk controller operation by performing nondestructive, read-only tests on the SCSI hard disk or floppy drives unless the user enables destructive tests with **cf**. The SCSI disks to be tested must be initialized (formatted or have an operating system file system on them). Refer to the operating system documentation for information on formatting or select the format test from the SCSI drive menus.

When a SCSI hard disk/floppy test displays an error, it also displays the command that failed, the physical sector, and other information about the controller and drive status. This information is saved in a local Error Log that is not cleared by the system command **clear**.

To access the test menus for the MVME147 board, type:

SA: 147.0

A display similar to the following appears:

```
Current Menu is /bdtest/147.0 - "VME147 Board Tests"
psp                    - 147 Serial Port Tests
mmu                    - Enable MMU
plp                    - 147 Line Printer Tests
scsi6                  - SCSI Ctrlr 6 LUN 0 Tests
scsi5                  - SCSI Ctrlr 5 LUN 0 Tests
scsi4                  - SCSI Ctrlr 4 LUN 0 Test
scsi3                  - SCSI Ctrlr 3 LUN 0 Tests
scsi2                  - SCSI Ctrlr 2 LUN 0 Tests
scsi1                  - SCSI Ctrlr 1 LUN 0 Tests
scsi0                  - SCSI Ctrlr 0 LUN 0 Tests
intrp                  - 147 Interrupter Test
lan147                 - 147 LANCE Tests

SA:
```

The test selection menus for the **mmu**, **plp**, and **scsi**_n_ are shown below:

```
SA: mmu <CR>   (to access the mmu test selection menu)
Selections for Test "Enable mmu"
     0) Enable MMU   (Once the MMU is enabled, it cannot be disabled.)

SA: plp <CR>  (to access the line printer test selection menu)
Selections for Test "147 Line Printer Test"
     o) Printer Output   (outputs pattern with length/#lines specified in cf)

SA: psp <CR>   (to access serial test selection menu)
Selections for Test "147 Serial Port Tests"
     1) Internal-loopback   (internal LB tests on ports 3 and 4)
     9) External-loopback   (external LB between ports 3 and 4)
SA: intrp   (to access VMEchip interrupter test selection menu)
Selections for Test "147 Interrupter Test"
     1)  interrupter   (VMEchip interrupter test)
SA: lan147   (to access LANCE test selection menu)
Selections for Test "147 LANCE Tests"
     1)  LANCE Init   (initialize LANCE chip)
     2)  LANCE Internal Loopback   (internal LB and DMA test)
```

Enable MMU - MMU

Turns on the MMU so that all future memory accesses are done using the MMU. The only way to turn the MMU off again is to power cycle and reboot the system.

Printer Output - plp

Outputs a predefined character string to a printer attached to the MVME147 parallel port. You can change the number of lines to print and the length of each line to print by entering **cmdline** mode, executing **cf 147.0/plp**, and changing the displayed values. The default is 56 lines of 132 characters each.

5

Internal Loopback - psps

Puts each port of the serial controller chip into internal loopback mode and transfers and verifies a predefined character string. You can change the number of characters to transfer by entering **cmdline** mode, executing **cf 147.0/psp** and changing the displayed value. The default valus is 1024 characters.

External Loopback - psp

Places port **1** of the serial controller chip in receive mode port **2** in transmit mode, and transfers and verifies a predefined character string. If this process completes successfully, port **1** is placed in transmit mode, port **2** into receive mode, and the test is repeated. You can change the number of characters to transfer by entering **cmdline** mode, executing **cf 147.0/psp** and changing the displayed value. The default valus is 1024 characters.

Interrupter - intrp

Checks interrupt levels 1, 2, 4, and 5 of the VMEchip for local interrupts.

LANCE Init - lan147

Checks the ability of the LANCE chip to read an initialization block from memory and configure itself accordingly. No data is transferred other than the initialization block.

LANCE Internal Loopback - lan147

Checks the ability of the LANCE chip to access the transmit and receive rings and to transfer data to/from the LAN buffers. The LANCE chip is placed into internal loopback mode and transfers a predefined character string. You can change the number of characters by entering **cmdline** mode, executing **cf147.0/lan147**, and changing the displayed value. The default value is 1024. The total nubmer of characters to be transmitted is broken into small packets so that multiple packets are transferred.

```
SA: scsi4 <CR>
Selections for Test "147SCSI Ctrlr 4 LUN 0 Tests"
(write-enabled scratch tape required)
(This menu is the same for all SCSI tape tests.)

  0)  Init                (returns tape to BOT)
  1)  Write Log/EOF       (short write test)
  2)  Read Log/EOF        (short read test; run after test 1
  3)  Write/Read EOF      (reads if write passes
  r)  Retension           (fast forward, then rewind the tape)
  s)  Erase               (remove ALL data from tape and rewind)
  w)  Write/Read EOT      (reads if write passes)
  t)  Write EOT           (long write test)
  v)  Read EOT            (long read test; run after test t)
  g)  Confidence Test     (verifies SCSI interface to drive)
  i)  Inquiry             (displays the vendor and drive ID) .ne 4i
  e)  Displays Error Log  (displays the local error log)
  l)  Clear Error Log     (clears the local error log)
  m)  Mode Sense          (displays drive mode info)
SA: scsi0 <CR>    (to access the first SCSI hard disk test)
  Selections for Test "147SCSI Ctrlr 0 LUN 0 Tests"

  0)  Recalibrate           (sends initialized parameters)
  1)  Confidence test       (reads last sector, then first sector)
  2)  Read entire Disk      (reads every sector on the disk)
  3)  Random read Disk      (randomly reads most sectors on the disk)
  4)  Ping-Pong read disk   (reads start, then end, then start +1, then end -
                             1, etc.)
  r)  Read a Sector         (allows reading of any sector; accepts hexadecimal
                             or decimal input)
  s)  Read a range of sectors  (queries user for sector range)
  c)  READ CAPACITY         (displays drive capacity in sectors)
  i)  Inquiry               (displays vendor and drive ID)
  e)  Display Error Log     (displays local error log)
  l)  Clear Error Log       (clears local error log)
```

Display Error Log

The first 20 scsi errors occurring on each drive are saved in the Error Log. After completion of SCSI tests, you can display the Error Log for each drive using this menu option. The drive must be ready, i.e., tape or floppy installed, for this command to execute. The system **clear** command only clears the system Error Log —it does not clear this device Error Log. (Refer to *Clear Error Log* below). If no errors occurred on this device, the following displays:

```
SA: e
/bdtest/147.0/scsi4    e)Display Error Log    ... starts
End of SCSI Error Log
/bdtest/147.0/scsi4    e)Display Error Log    ... passed
```

A display similar to the following displays if errors occurred on this device:

```
SA: e
/bdtest/147.0/scsi4      e)Display Error Log      .....starts
Command              Code/Sector      Error Message
WRITE                0x00000027       PROTECTED_MEDIA
        Class 7 Sense is controller-dependent.
        Refer to vendor manuals to decode.
        f0 00 07 00 00 00 80 06 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00
Command              Code/Sector      Error Message
TAPE_ATTACH          0x00000022       DEVICE_NOT_READY
Press RETURN for next page
        Class 7 Sense is controller-dependent.
        Refer to vendor manuals to decode.
        f0 00 07 00 00 00 80 06 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
        00 00 00 00 00 00 00 00 00 00 00 00
Command              Code/Sector      Error Message

TAPE_ATTACH          0x00000022       DEVICE _NOT_READY
Press RETURN for next page
Command              Code/Sector      Error Message
TAPE_ATTACH          0x00000022       DEVICE_NOT_READY
Command              Code/Sector      Error Message
TAPE_ATTACH          0x00000022       DEVICE_NOT_READY
Press RETURN for next page
End of SCSI Error Log
/bdtest/147.0/scsi4  e)Display Error Log          .....passed
***SYSTEM TEST FAILED***
Depress Return to Continue
```

Clear Error Log

Clears the device error log.

CAUTION

Destructive disk tests destroy all data on the drive. Be extremely careful with test selection after enabling destructive tests with either the "eval flag" and/or the "set test scripts" command!!!!!

Destructive Disk Tests

Destructive hard/floppy disk tests are available from the menu by going into the cmdline mode and executing **cf** for *each* scsi device you want to execute destructive tests. By changing the **eval flag** to **1**, the following tests appear on the Hard Disk menu:

```
f) Format Hard Drive (DESTRUCTIVE) (formats drive)
a) Assign Alternate (DESTRUCTIVE) (adds defects to the drives defect list)
w) Write All Sectors (DESTRUCTIVE) (writes all sectors)
x) Wr/Rd/Compare Sectors (DESTRUCTIVE) (writes, reads, verifies all sectors)
y) Wr/Rd/Compare Tracks(DESTRUCTIVE)  (same as test x but reads by tracks)
z) Set Test Scripts  (toggles confid 5 to 1 from destructive tests)
```

Format Hard Drive (DESTRUCTIVE)

Formats the disk using the same parameters used during read tests (i.e., if the drive is configured as 256 bytes per sector, the drive is formatted using these parameters.)

NOTE

> This is a diagnostic format only. You must format the drive by the operating system before use by the operating system.

Write All Sectors (DESTRUCTIVE)

Writes all sectors on the hard disk.

Wr/Rd/Compare Sectors/Tracks (DESTRUCTIVE)

Writes each sector/track with a unique pattern, reads the sector/track into a buffer and verifies that the pattern read is the same pattern that was written. This test takes a long time in sector mode (can be more than 24 hours depending on disk capacity). Track mode is much faster, taking less than 30 minutes on most drives.

Set Test Scripts

Used to reconfigure confid string 5 (Continuous Running Intensive I/O check with Comm.) for destructive testing on hard and floppy disks with the eval flag set to "1". The destructive mode flag for 147 SCSI devices is TOGGLED each time this command is executed at any disk menu. If destructive mode is enabled, the following message displays:

```
WARNING:  DESTRUCTIVE DISK TESTS FOR ALL 147 SCSI FLOPPY AND HARD
          DISKS WITH THE EVAL FLAG SET HAVE BEEN ADDED TO CONFID
          #5 AND FAULT SCRIPTS.
```

If destructive mode for 147 SCSI devices is disabled, the following message displays:

```
ALL 147 DISK CONFID AND FAULT SCRIPTS ARE NOW READ ONLY
```

Destructive test *warning messages are disabled* during confid 5 testing to allow unattended destructive tests.

Using the view confid command shows destructive tests for *all* 147 disks, but the destructive tests are only run on drives with the "eval flag" set to 1. Any disk with the "eval flag" set to 0 displays the following message (where X is the SCSI controller ID and Y is the drive LUN):

```
Unable to perform test on 147 target X drive Y - eval flag not set
```

Normally, destructive disks display a warning message and ask the user if they want to continue before any destructive tests are run. This warning message can be *overridden* by using **cf** to change the **conf** flag to a 1. If the "confid" flag is set to a "1", *no warning messages* display.

The Destructive Floppy menu contains one additional test:

Partial Write Test (DESTRUCTIVE)

Randomly writes some sectors on the floppy.

MVME147 Board Test Configuration

The MVME147 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 147.0
/bdtest/147.0 configuration
  base [0xFFFE1000] = 0xFFFE1000 ?        # base address of pcc chip
  level [0-7] = 6 ?                       # default interrupt level
  mode [0] = 0 ?                          # can not be
  warning msgs [0] = 0 ?                  # changed by user
```

```
> cf 147.0/psp
/bdtest/147.0/psp configuration
  xfer size [0-1024] = 1024 ?                      # size per transfer

> cf 147.0/scsi0
/bdtest/147.0/scsi0 configuration
  Ctrlr number [2] = 2 ?                           # scsi target number
  phy-drive [0-3] = 0 ?                            # drive number
  vector number [0-0xFF] = 0x4D ?                  # scsi fw vector number
  Conf flag 0-Warnings ON 1-Warnings OFF [0-1] = 0 ? # disable warning
  Eval flag 0-NO write 1-WRITE TESTS [0-1] = 0 ? 0 # enable destructive tests

> cf plp
/bdtest/147.0/plp configuration
  line length [0-136] = 132 ?                      # length of line to print
  number lines [0-4096] = 56 ?                     # number of line to print

> cf lan147

/bdtest/147.0/lan147 configuration
  xfer size [0-1024] = 1024 ?
```

MVME147 Error Messages

General Error Messages

XXXXX Memory not available
XXXXX YYYYY Memory not available
XXXXX YYYYY NO Memory for Buffer

Indicates that no memory was available when a buffer was requested by test XXXXX. YYYYY indicates the specific function within a test, if available. Possibly there are too many tests running, defective memory or 147 board.

XXXXX YYYYY No system semaphore
XXXXX YYYYY No semaphores available

Indicates that no semaphore was available when requested by test XXXXX. YYYYY indicates the specific function within a test, if available. Possibly there are too many tests running, defective memory or 147 board.

PCCchip is programmed for Lvl 7 IRQ on Bus Error

Indicates the PCCchip Bus Error Interrupt Control register has been programmed to generate a level 7 IRQ when a bus error occurs. This indicates a problem on the 147 board as SSID disables the interrupt during initialization at boot time.

Error in setvec from XXXXX (YYYYY,ZZZZZ)
**Help setvec failed In XXXXX (YYYYY)
**Help setvec failed in XXXXX (YYYYY)

Indicates an error occurred while SSID was attempting to set interrupt vectors. XXXXX indicates the SSID function where the error occurred. YYYYY indicates the vector address SSID was attempting to change so that interrupt handler ZZZZZ is executed when the interrupt occurred. This indicates a problem on the 147 board.

Error In setvec in usrinit for 147 LANCE

Indicates an error occurred while setting up interrupt handler for the 147 LANCE chip. This indicates a problem on the 147 board.

Name of this routine is cpux147. Some program accessed the Location Monitor adrs $FFFE0000 thru $FFFEFFFF.

Indicates that the location monitor was accessed when it should not have been accessed. Some board in the system is incorrectly accessing memory.

SSID fatal error: get_stbl() - unrecognized SCC channel address
SCC channel address = 0xXXXXX
SSID IS NOW HALTED

An interrupt was received through the vector assigned to the SCC chips but an invalid SCC channel address (XXXXX) was received. Some device in the system is interrupting through the wrong vector or an SCC is returning an incorrect channel address. You must reboot the system for any further action to occur.

System Test error: Unrecognized SCC interrupt
SCC interrupt status = XXXXX
SSID IS NOW HALTED

An interrupt was received through the vector assigned to the SCC chips but an invalid interrupt status was received. Indicates a problem with the SCC chip(s) on the 147 board. The system is halted and must be rebooted for any further action to occur.

XXXXX Max number of errors exceeded

The device indicated by XXXXX has exceeded the maximum number of allowed errors. No additional errors will be logged for this device.

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XXXXX SIGLP_IRQ failed
XXXXX TIME_OUT -- SIGLP_IRQ
XXXXX LMO_IRQ failed
XXXXX TIME_OUT -- LMO_IRQ
XXXXX LM1_IRQ failed
XXXXX TIME_OUT -- LM1_IRQ
XXXXX SIGHP_IRQ failed
XXXXX TIME_OUT -- SIGHP_IRQ

Indicates failure of the VMEchip interrupter test. Possibly a defective VMEchip or 147 board. XXXXX indicates the 147 board "intrp" test.

XXXXX TIMEOUT

Indicates a test on device XXXXX timed out before the device interrupted with completion status. This can indicate a problem with device XXXXX or possibly the loopback cable is loose if the device is a serial port.

SCSI Error Messages

SCSI timeout - no response from target X drive Y

The SCSI command was sent but the device did not interrupt with completion status in the time period allowed by SSID for completion of the command. X indicates the SCSI target ID (controller), Y indicates the LUN (device) ID. This message also occurs if the SCSI bus is hung. Try the BUG reset command or power cycle the system.

ERROR: XXX: IRQ handler packet not Que'd!

This message occurs if the SCSI device interrupts after a timeout has occurred or when SSID is not waiting for an interrupt from the device. XXX indicates from which SCSI device the interrupt was received. Try resetting the SCSI bus or power cycling the system and rebooting SSID. If the error continues, SSID could have a timeout that is too short or the SCSI device or 147 SCSI interface could be defective. Also check SCSI cabling and SCSI bus termination.

UNDEFINED SCSI CMD: XXXXX

Indicates an error during testing of a SCSI device. An undefined command (XXXXX) was indicated as failing. Possibly caused by defective memory or SCSI interface on 147 board.

UNDEFINED SCSI STATUS: XXXXX

A SCSI device returned status of XXXXX which is undefined in the SCSI status tables. Refer to the vendor manual for the device or *MVME147 SCSI Firmware User's Guide* for further information.

XXXXX Unable to read disk capacity

SSID was unable to execute the SCSI Read Capacity command on the device indicated by XXXXX. Indicates defective SCSI device or device that does not support this command or defective SCSI interface on 147 board.

Target number X out of range - must be between 0 and Y

The selected SCSI target number is less that 0 or greater than the maximum allowed. This error can occur if an incorrect value is entered in the configuration structure using the **cf** command line command or the SCSI device table in memory has been overwritten. Target addresses are between 0 and 6.

No device assigned for target X

The device pointer in the SCSI device table is null. This occurs if the SCSI device table in memory has been overwritten.

Invalid device type X for target Z

The device type X in the SCSI device table is invalid for target number Z. This occurs if the SCSI device table in memory has been overwritten.

XXXXX The drive selected is invalid

The selected SCSI drive number is invalid for device XXXXX. This error can occur if an incorrect value is entered in the configuration structure using the **cf** command or the SCSI device table in memory has been overwritten.

Unable to perform test on 147 target X drive Y - eval flag not set

Indicates destructive test will not be run on SCSI target X (controller) drive Y (LUN). This message displays during destructive confid/fault tests for drives that are not enabled for destructive tests.

LANCE Error Messages

XXXXX LANCE test invalid on this board

SSID has determined that no LANCE chip exists on the 147 board and therefore, no LANCE tests are supported.

NO LANCE detected on this board

Indicates that no LANCE tests will be run on 147 boards that do not contain a LANCE chip.

XXXXX 147 LANCE YYYYY FAILED

Indicates a failure of 147 LANCE tests (XXXXX). YYYYY indicates the failing test.

REG XX EXP: YY GOT: ZZ

Indicates an unexpected reading from LANCE register XX during testing. SSID expected to read YY from the register but instead read ZZ.

147 LANCE TESTS ERROR # XXX
    Indicates a LANCE test failure where XXX is:

1	147 board resource timeout
2	147 board ram parity error
3	147 board unexpected exception
4	147 board invalid test command from host
8	147 board ACFAIL
20	csr error - set with one
40	csr error - set with zero
60	csr error - can't set with one
80	csr error - can't clear with one
100	csr error - can't clear with zero
120	csr error - cleared with one
140	csr error - cleared with zero
160	csr error - unexpected bits on
164	csr error - unexpected bits on
168	csr error - unexpected bits on
172	csr error - unexpected bits on
176	csr error - unexpected bits on
180	csr error - unexpected bits on
184	csr error - unexpected bits on
188	should have STOP set, strt & INIT clear
189	CSR read while INIT bit set
191	IDON not set after INIT
192	INTR not set after INIT
193	unexpected bits on after INIT
194	RXON or TXON not set after START
195	unexpected bits on after START
196	IDON not set
197	unexpected bits on after INIT
198	no packet received
199	TINT not set after transmit
200	transmit interrupt count invalid
201	receiver interrupt count invalid
202	missed packet interrupt count invalid
203	expected packet not received
204	expected packet not received
205	net too busy - retry test
206	buffer space unavailable
207	buffer space unavailable
208	not enough transmit buffer
209	all transmit buffers used up
210	unexpected transmission error
211	expected transmission error not occurred
212	babbling transmitter
213	memory error in transmission
214	collision error after transmit

215	unexpected receive error
216	expected receive error not occurred
217	memory error in receive
218	received and sent data not match
219	trailing data bytes missing
220	rmd1 has end of packet set only
221	bad CRC found in received packet
222	RINT not set after transmit in loopback
223	Expected packet not received
224	Transmitter should be disabled
225	Unexpected packet transmitted
226	Receiver should be disabled
227	Unexpected packet received

5

Serial Port Error Messages

XXXXX Data miscompare

Indicates a miscompare of data during serial port tests.

Parallel Printer Error Messages

plp Printer status: ACK xxx present,
FAULT xxx present, SELECT xxx present
PAPER/EMPTY xxx present, BUSY xxx present

where **xxx** is either *is* or *is not* to indicate the presence/absence of the indicated status signal.

SCSI Packet Display

If an error occurs during execution of a SCSI packet and the display packet (dp) is disabled, a message similar to the following appears:

```
/bdtest/147.0/scsi0      2) Read entire Disk     ...... starts
PASS=0, FATAL=000, ERROR=000 0:00:43 /bdtest/147.0/scsi0 : waiting
  Final Status Code 23 NONRECOVERABLE_(HARD)_ERROR
  SCSI COMMAND 0, READ
  Error on SCSI target 0 drive 0
  SECTOR Adrs 0x00007c2d
/bdtest/147.0/scsi0      2) Read entire Disk     ...... failed

  NONRECOVERABLE_(HARD)_ERROR 0x00007c2d
*** SYSTEM TEST FAILED ***
```

In this example, the final status code **23** indicates that a nonrecoverable or hard error occurred while executing a SCSI **read** command on SCSI target 0, drive 0. The read error occurred on sector 0x00007c2d.

When the test is completed, a recap of the errors displays, listing the error type and the sector at which the error occurred.

If the display packet (dp) option is enabled, additional information similar to the following displays:

```
/bdtest/147.0/scsi0      2) Read entire Disk      ...... starts
PASS-0, FATAL-001, ERROR-000  0:00:43 /bdtest/147.0/scsi0 : waiting
  SCSI PKT STATUS 0-3 40 23 80 00
  Stat0: Final_status :External_stat_Valid :rte_return : No_restart_cmd :
No_que'ed_packet : Bit_Res_Low :Bit_Res_Low : Bit_Res_Low :

  Final Status Code 23 NONRECOVERABLE_(HARD)_ERROR
  Stat2: Phase code 00
  Stat3: Bit_Res_Low :Bit_Res_Low :_ :_ :
  :_ :_ :Bit_Res_Low :
  SCSI COMMAND 0, READ
  Error on SCSI target 0 drive 0
  SECTOR Adrs 0x00007c2d
/bdtest/147.0/scsi0      2) Read entire Disk      ...... failed

  NONRECOVERABLE_(HARD)_ERROR 0x00007c2d
*** SYSTEM TEST FAILED ***
```

The additional information for this example includes:

SCSI PKT STATUS 0-3 40 23 80 00
The values of the SCSI status bytes 0 through 3 are 40, 23, 80, and 00. The balance of the display defines the status represented by these bytes. You can also use Tables 5-1 and 5-2 to decode the status bytes.

Stat0: Final_status
This is final, not intermediate, status.

:External_stat_Valid
External status information is valid and available to the test program.

:rte_return
A rte is required by the test program to continue processing from where an interrupt occurred.

Bit_Res_Low
The bit is reserved and should be 0.

Stat2: Phase code 00
The SCSI bus phase in which the error occurred.

Stat3: Bit_Res_Low . . . :Bit_Res_Low :
An interpretation of status byte 3. In this example there is no pertinent information.

Refer to the *MVME147 SCSI Firmware User's Manual* for details.

Table 5-1. MVME147 SCSI Packet Return Status

STAT 0   STAT 1

15   08   07   00

Control Flags	Status Code (Refer to Table 4-1)

└───── Bits 12-8 (reserved)

└───── Bit 13 (RTE FLAG) (of interest only to the
            programmer)
        1 = This return was not preceded by an
            interrupt and is the first return since
            command entry. In this case, no RTE is
            required.
        0 = This return was preceded by an interrupt
            and is not the first return, therefore,
            an RTE is required to continue proces-
            sing from where an interrupt occurred.
            Register A3 has a pointer to a register
            save area (D0-D7, A0-A6).

└───── Bit 14 (ADDITIONAL STATUS)
        1 = External status is valid.
        0 = External status is not valid.

└───── Bit 15 (FINALSTAT)
        1 = Intermediate return.
        0 = Final status.
            The script processing completed succ-
            essfully, OR the script processing
            encountered a fatal error.

NOTE

This does not mean that the operation the user
requested on the SCSI was successful. The status is
contained in the status code (bits 7-0.)

Table 5-1. MVME147 SCSI Packet Return Status (cont'd)

15		12	11		08	07		04	03		00
SCSI Phase Status			Reserved						Request Sense Flags (0 if not used)		

Bit 0 (RES) Re-served)

Bit 1 (ILI) Incorrect length indicator.

Bit 2 (EOM) Logical end of media (early warning).

Bit 3 (FM) Filemark

Bit 4 (COMMAND RETRY) 1 = Retries were performed.

Bit 5 (COMMAND RE-TRY OVERFLOW) 1 = Retry overflow. The command was retried "retry count" times.

Bits 6 and 7 (reserved)

Bit 15 (PHASE VALID) 1 = Phase code is in D14-D12. 0 = Data in D14-D12 is not valid.

5

Table 5-2. Packet Status Codes

CODE	MEANING	NOTES
	Intermediate Return Codes	
$02	Wait for interrupt; command door open. OK to send new commands for other devices to firmware.	1
$04	A message has been received. User must interpret.	1
	Final Return Codes	
$00	GOOD. Script processing is OK.	2
$01	Undefined problem.	2
$02	Reserved.	2
$03	Interrupt handler was entered with no pending IRQ ($FFFE0788).	2
$04	Reselection not expected from this TARGET.	2
$05	TARGET thinks it is working on linked commands but the command table does not.	2
$06	Linked command has error status code; command has been aborted.	2
$07	Received an illegal message.	2
$08	The message we have tried to send was rejected.	2
$09	Encountered a parity error in data-in phase, command phase (TARGET only), status phase, or message-in phase. (Refer to bits 15-12 of second status word.)	2
$0A	SCSI bus RESET received.	2
$0B	Command error (bad command code, bad timing, or command door was closed when a command was received) = 00. Custom SCSI sequence: controller level not equal to "147 local level", or interrupt not on. Format: format with defects on a controller type not supported. Controller reset: controller not SCSI type. Space (tape): undefined mode. Mode select (tape): undefined controller type. Mode sense (tape): undefined controller type.	2

Table 5-2. Packet Status Codes (cont'd)

CODE	MEANING	NOTES
$0C	Size error (invalid format code).	2
$0D	Bad ID in packet or local ID ($FFFE07A6).	2
$0E	Error in attach (not previously attached, bad device LUN, unsupported controller, target SCSI address conflicts with initiator).	2
$0F	Busy error (device has a command pending).	2
$10	Byte Count Error. There is disagreement between initiator and TARGET about the number of bytes that are to be transferred. If bit 15 of status = 1, then bits 12-14 contain the phase code.	2
$11	Received a BERR* while in DMA mode from a device that did not respond fast enough.	2
$12	Selection time-out. TARGET does not respond.	2
$13	SCSI protocol violation. Controller reset: controller not SCSI.	2
$14	Script mismatch. CHECK STATUS. If SCSI status within Command Table (offset $14 for custom sequence, otherwise $64) is zero, then assume script mismatch, otherwise use SCSI packet status.	2
$15	Script mismatch. The TARGET sequence of operation did not match the script.	2
$16	Illegal SCSI state machine transition.	2
$17	Command has been received (in TARGET role).	2
$18	Script complete in TARGET role.	2
$19	Script complete and new command loaded (TARGET role).	2
$1A	TARGET module called. TARGET role not supported.	2
$1B	TARGET module rejected an initiator message and returned with this status to a particular LUN service routine.	2

5

Table 5-2. Packet Status Codes (cont'd)

CODE	MEANING	NOTES
$1C	TARGET module sent a check status with an "illegal request" sense block to some initiator because the particular LUN that the initiator wanted was not enabled.	2
$1D	TARGET module sent a busy status to the calling initiator because the particular LUN that the initiator wanted was already busy servicing a command.	2
$1E	Reserved and unused.	2
$1F	Reserved.	2
Request-Sense-Data Error-Class 7 Codes (Controller-Dependent)		
$20	NO SENSE. Indicates that there is no specific sense key information to be reported for the designated logical unit.	2,3
$21	RECOVERED ERROR. Indicates that the last command completed successfully with some recovery action performed by the TARGET. Details can be determined by examining the additional sense bytes and information bytes.	2,3
$22	NOT READY. Indicates that the logical unit addressed cannot be accessed. Operator intervention may be required to correct this condition.	2,3
$23	MEDIUM ERROR. Indicates that the TARGET detected a nonrecoverable error condition that was probably caused by a flaw in the medium or an error in recording data.	2,3
$24	HARDWARE ERROR. Indicates that the TARGET detected a nonrecoverable hardware failure (for example, controller failure, device failure, parity error, etc.) while performing the command or during self test.	2,3
$25	ILLEGAL REQUEST. Indicates that there was an illegal parameter in the command descriptor block or in the additional parameters supplied as data.	2,3

Table 5-2. Packet Status Codes (cont'd)

CODE	MEANING	NOTES
$26	UNIT ATTENTION. Indicates that the removeable media may have been changed or the TARGET has been reset.	2,3
$27	DATA PROTECT. Indicates that a command that Reads or Writes the medium was attempted on a block that is protected from this operation.	2,3
$28	BLANK CHECK. Indicates that a write-once read-multiple device or a sequential access device encountered a blank block while reading or a write-once read-multiple device encountered a nonblank block while writing.	2,3
$29	VENDOR UNIQUE. Used for reporting vendor unique conditions.	2,3
$2A	COPY ABORTED. Indicates that a copy or a copy and verify command was aborted due to an error condition.	2,3
$2B	ABORTED COMMAND. Indicates that the TARGET aborted the command. The initiator may be able to recover by trying the command again.	2,3
$2C	EQUAL. Indicates a search data command has satisfied an equal comparison.	2,3
$2D	VOLUME OVERFLOW. Physical EOM. Indicates that a buffered peripheral device has reached an end-of-medium and data remains in the buffer that has not been written to the medium. A recover buffered data command may be issued to read the unwritten data from the buffer.	2,3
$2E	MISCOMPARE. Indicates that the source data did not match the data read from the medium.	2,3
$2F	RESERVED. This sense key is reserved.	2,3

5

Table 5-2. Packet Status Codes (cont'd)

CODE	MEANING	NOTES
	SCSI Status Returned in Status Phase	
$31	SCSI status = $02. CHECK.	2,4
$32	SCSI status = $04. CONDITION MET.	2,4
$34	SCSI status = $08. BUSY.	2,4
$38	SCSI status = $10. INTERMEDIATE / GOOD.	2,4
$3A	SCSI status = $14. INTERMEDIATE / CONDITION MET / GOOD.	2,4
$3C	SCSI status = $18. RESERVATION CONFLICT.	2,4
	Request-Sense-Data Error-Classes 0-6 Codes (Controller-Dependent)	
$40	NO ERROR STATUS.	2,5,6
$41	NO INDEX SIGNAL.	2,5,6
$42	NO SEEK COMPLETE.	2,5,6
$43	WRITE FAULT.	2,5,6
$44	DRIVE NOT READY.	2,5,6
$45	DRIVE NOT SELECTED.	2,5,6
$46	NO TRACK 00.	2,5,6
$47	MULTIPLE DRIVES SELECTED.	2,5,6
$49	CARTRIDGE CHANGED.	2,5,6
$4D	SEEK IN PROGRESS.	2,5,6
$50	ID ERROR. ECC error in the data field.	2,5,7
$51	DATA ERROR. Uncorrectable data error during a read.	2,5,7
$52	ID ADDRESS MARK NOT FOUND.	2,5,7
$53	DATA ADDRESS MARK NOT FOUND.	2,5,7
$54	SECTOR NUMBER NOT FOUND.	2,5,7

Table 5-2. Packet Status Codes (cont'd)

CODE	MEANING	NOTES
$55	SEEK ERROR.	2,5,7
$57	WRITE PROTECTED.	2,5,7
$58	CORRECTABLE DATA FIELD ERROR.	2,5,7
$59	BAD BLOCK FOUND.	2,5,7
$5A	FORMAT ERROR. (Check track command.)	2,5,7
$5C	UNABLE TO READ ALTERNATE TRACK ADDRESS.	2,5,7
$5E	ATTEMPTED TO DIRECTLY ACCESS AN ALTERNATE TRACK.	2,5,7
$5F	SEQUENCER TIME OUT DURING TRANSFER.	2,5,7
$60	INVALID COMMAND.	2,5,8
$61	ILLEGAL DISK ADDRESS.	2,5,8
$62	ILLEGAL FUNCTION.	2,5,8
$63	VOLUME OVERFLOW.	2,5,8

5

Table 5-2. Packet Status Codes (cont'd)

NOTES:

1. Intermediate return codes. Bit 15=1, actual word=$80xx, $90xx, etc.

2. Final return codes.

3. Sense key status codes for request-sense-data error -- class 7. An offset of $20 is added to all sense key codes.

4. The SCSI status sent from the controller is ANDed with $1E, shifted right one bit, and $30 added.

5. Sense key status codes for request-sense-data error -- classes 0-6. An offset of $40 is added to all sense key codes.

6. Drive error codes.

7. Controller error codes.

8. Command errors.

Interactive Memory Tests

The SSID interactive memory tests are designed to run interactively with other board tests. The memory diagnostics perform extensive tests of the memory board logic, RAM Chips, VSBbus interface, and VMEbus interface.

System memory boards must be strapped correctly for the interactive memory tests to work properly. The tests assume that memory is contiguous; any gaps that are found are assumed to be bad RAM. Likewise, any overlap in memory addresses is assumed to be bad RAM. Therefore, when testing a system with onboard RAM, the address of the first memory board (add-on memory) must begin at the address boundary of the onboard RAM. For example, if an MVME134 CPU board with 4Mb of onboard RAM is installed, the first memory board address must begin at the 4Mb boundary. For information on proper strapping of memory boards, refer to the System Manual for your particular system.

Two limitations are imposed on the total amount of memory in a given system:

1. In systems configured with either an MVME330A (OfficeLAN controller) or an MVME330B (RFS controller), total memory is limited to 12Mb.

2. In systems configured with an MVME320 (Winchester/Floppy Disk controller) but no MVME330A or MVME330B, total memory is limited to 16Mb.

The interactive memory tests work in the following manner:

The tests examine the diagnostic kernel's free list to determine which block of memory to test. Starting with the first block in the free list, the tests determine whether or not a memory block has already been tested. If it has not been tested, the memory tests access a predetermined portion of the memory block. The amount of memory accessed depends on the size of the contiguous block. The memory tests continue in this way until all available free memory has been tested.

At this point the memory tests check the process table to determine if other processes (using memory not yet tested) are running. The memory tests cannot access this untested memory until the processes quit. While waiting to access the memory, the memory tests take a free block and repeatedly test it. When all other processes quit, the memory tests access the remaining untested memory, test it, and then stop.

Memory tests check all contiguous RAM except the block of memory where SSID is loaded. SSID does not check parity because SST does this at system startup time.

If a memory board is failing, the interactive memory tests display a message identifying the bad address on the memory board. In some cases, the tests also display the expected and actual data. The interactive memory tests do not size memory but rather use the free memory found by the diagnostics kernel at startup time.

To access the test menus for the memory tests, type:

    SA: mem.0

A display similar to the following appears:

```
Selections for Test "Memory Test"

2) Interactive AA/55 Pattern
3) Interactive 00/FF Pattern
4) Interactive C3/3C Pattern
5) Interactive Cross Address Test
6) Interactive Walking Ones
7) Interactive Walking Zeros
8) Interactive X Move
9) Burn-in Memory Test
```

The following briefly explains the tests:

2) through 8)
By default, these tests perform the indicated pattern on every longword. All of RAM is written to and a verification read is performed.

It is possible to change the memory configuration to test address increments other than every longword, thereby changing the execution time of the memory tests. Refer to the **cf** command (Example 3) in Appendix A for details.

9) Burn-in Memory Test
This test performs tests 2 through 8 on each block of memory, using the increment value defined in the memory configuration to determine which longwords are tested. Since interactive memory tests run until all other board tests have finished, only one memory test can be run in any given set of board tests. By combining all of the memory tests into this one option, all of the memory tests can run concurrently with other board tests.

Interactive Memory Test Configuration

The interactive memory test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf mem.0
/bdtest/mem.O configuration
  walk_step = 1 ?                    # address increment value
```

MVME393 Multi-Channel Graphics Display Controller

The MVME393 Graphics Controller tests check the functionality of the MVME393 and the MVME792 transition board. To access the MVME393 tests, type:

> SA: **393.0** <CR>

The following display appears for the **gb** tests:

```
Current Menu is /bdtest/393.0 - "VME393 Multi-Channel Graphics Disp.
tests"

gb - VME393

SA: gb <CR>

Selection for Test "VME393"
(This menu is the same for all MVME393 boards)

      0) Board Reset
      1) Download Test
      2) Ext. Uart Test - 792 ONLY
      3) Test Pattern
      4) Loopback Test - 792 ONLY

SA:
```

This menu displays for all known MVME393 boards in the system:

0) Board Reset
    This option resets the MVME393 via the reset bit in the CSR and then verifies that some addresses in the dual-ported static RAM contain zeroes.

1) Download Test
    A mini program is moved into the GSP memory and executed. Then the GSP is checked to verify that it responded.

2) Ext. Uart Test
    This routing downloads a Uart process and executes it. Once the process has run, the results are verified. This test can *only* be done on an MVME792-1 or MVME792-2 transition board and requires the use of external serial port loopback cables.

MVME792-1/-2 Loopback Cabling and Pin Connections

Connect the loopback cables and the loopback cable pin connectors as shown.

MVME792-1   P1A <------> P1B
(using DB-9 pin connectors)   P2A <------> P2B

```
Male DB-9                              Male DB-9
connector                              connector
  pin #          (cable length 5 inches)    pin #

    1        <----------------------->        1
    4        <----------------------->        4
    2        <----------------------->        3
    3        <----------------------->        2
    7        <----------------------->        7
    8        <----------------------->        8
```

MVME792-2   P1 *(wires are internal to the connector)*
(using 17W5 pin connectors)   P2 *(wires are internal to the connector)*

```
  17W5                                  17W5
connector                             connector
  pin #          (cable length ? inches)   pin #

    1        <----------------------->        4
    2        <----------------------->        9
    5        <----------------------->        6
    7        <----------------------->        10
    8        <----------------------->        3
    8        <----------------------->        8
```

NOTE

The RGB connections may be connected to a monitor during any of the tests.

3) **Test Pattern**
   This test moves a color bars program into the GSP memory and executes it.

4) **Loopback Test**
   This test can *only* be done on an MVME792-(1 or 2) transition board; it does not use external loopbacks. This routine downloads a Uart process and executes it. Once the process has run, the results are verified.

MVME393 Board Test Configuration

The MVME393 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 393.0
/bdtest/393.0 configuration
  base[%0x10] = 0xfffffa800 ?        # base address
  am[0x0d,0x3d] = 0x3d ?
  dsz[1-2] = 2 ?
  level[0-7] = 3 ?
  vec[0x40-0x100] = 0xfffffff98 ?
```

MVME050 Utility Board

The three test groups for the MVME050 Utility Board are shown below followed by the menu selections for each test.

```
SA: 050.0 <CR>    (to select the VME050 Utility Board Tests)

Selection for Test "VME050 Utility Board Tests"

sp  - Serial Port Tests
tod - Real Time Clock
mi  - Miscellaneous Board Functions

SA: sp <CR>

  1) Internal-loop     (no external cable required)
  2) Baud Rate
  3) Parity
  4) External-loop     (requires a plug)
  5) Rx intr          (receiver interrupt)
  6) Tx intr          (transmitter interrupt)
  7) Interface intr    (RS-232 signal interrupt)

SA: tod <CR>

  0) Reg & Ram        (Register and RAM)
  1) Counters
  2) Periodic Intr
  3) Update Intr
  4) Alarm Intr

SA: mi <CR>

  0) LED Display       (LED = light-emitting diode)
  1) Read Switch
  2) Global BIM        (Global Bus Interface Module)
  3) Printer loop
  4) Printer Intr

SA:
```

MVME050 Board Test Configuration

The MVME050 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 050.0
/bdtest/050.0 configuration
  base[%0x100] = 0xffff1000 ?          # base address

> cf 050.0/ml
/bdtest/050.0/ml configuration         # miscellaneous

> cf 050.0/tod
/bdtest/050.0/tod configuration        # real time clock

> cf 050.0/sp
/bdtest/050.0/sp configuration         # serial port - sp050
  xfer size = 512 ?              .
```

5
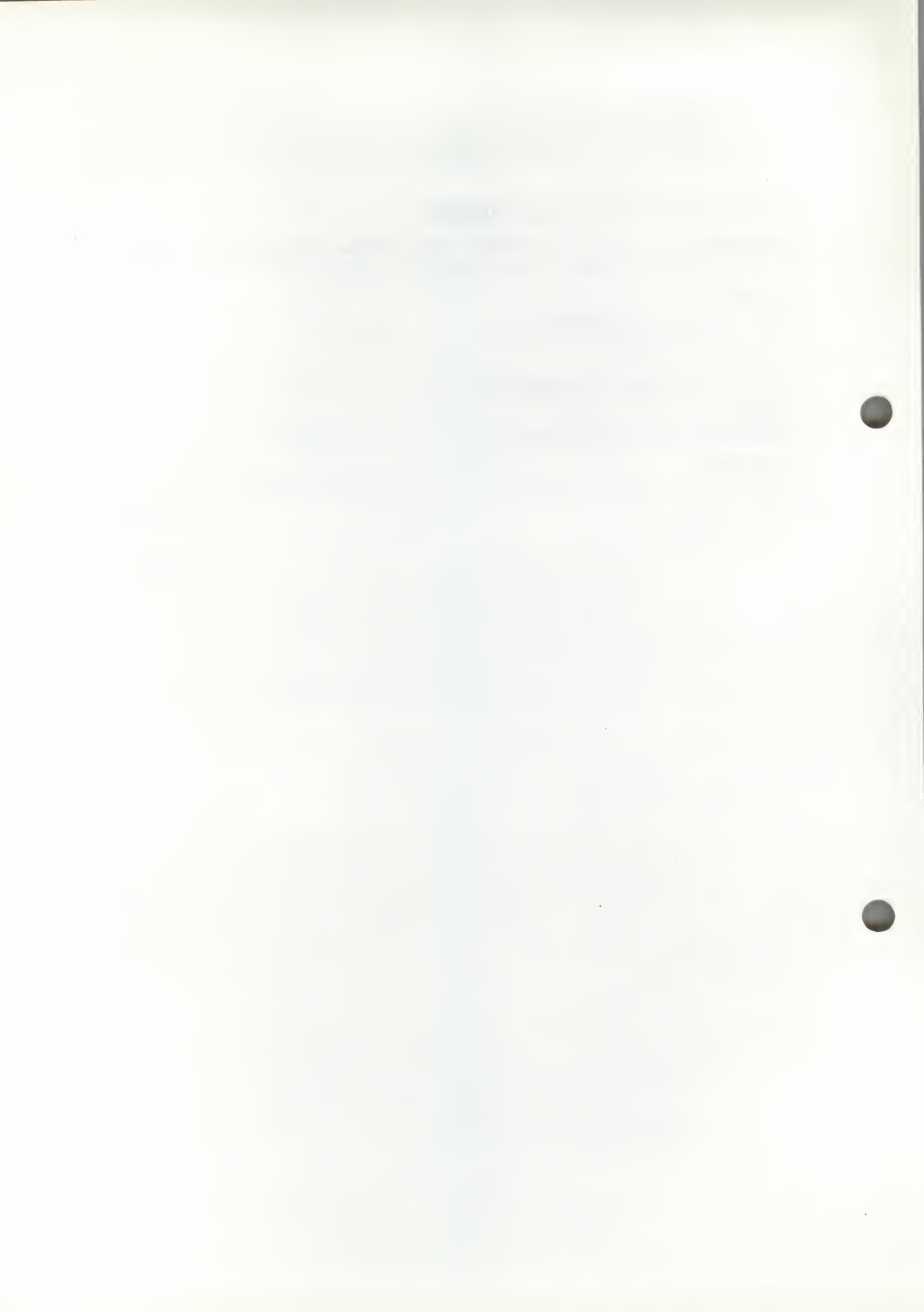
CHAPTER 6

MASS STORAGE DEVICE CONTROLLER BOARD TESTS

This chapter describes the board tests available for mass storage device controllers. Each section describes the tests available for a particular controller board, the board's test configuration, and, in some cases, the error codes associated with the board. For an introduction to board testing, refer to *Board Testing* in Chapter 4.

MVME320 Winchester/Floppy Controller

The MVME320 board tests verify controller operation by performing read-only tests on the Winchester disk drive and read only or write/read tests on the floppy disk drive. The floppy tests are set up for double-sided, double-density, 80-track floppies. You cant test both 655K low speed floppy disks and 1.2Mb high speed floppy disks. If you are testing 1.2Mb floppies, you must change the default floppy disk configuration. (Refer to the **cf** command, Example 4, in Appendix A for details.)

You can install a maximum of two MVME320 controllers in a system. The Winchester tests are designed for Micropolis (default) and Toshiba drives. If you have a Toshiba drive, use the **cmdline** system command to change the Winchester drive type. (Refer to the **cf** command, Example 2, in Appendix A for details.)

Winchester Disk Tests

These tests are all nondestructive read-only tests. You must format the disk drives with SYSTEM V/68 format which includes the bad track list for software bad track support. All read tests check the bad track list for the current track before performing the read operation. If the current track is found in the bad track list, the current track is not read and the test continues to the next track.

To access the test menus for the Winchester and floppy disk drives, type:

SA: **320.0**

MASS STORAGE DEVICE CONTROLLER BOARD TESTS

A display similar to the following appears:

```
Current Menu is /bdtest/320.0 - "VME320 Disk Controller Tests"

hd.1              - Winchester Disk
hd.0              - Winchester Disk
fd.1              - Floppy Disk
fd.0              - Floppy Disk

SA: hd.0 <CR>    (to access the test selection menu for the first Winchester disk)

(The following menu is displayed for hd.0 and hd.1)

Selections for Test "Winchester Disk"

     0) Recalibrate
     1) Quick confidence read
     2) Read entire OS disk
     3) Random read OS disk
     4) Ping-pong read OS disk
     5) Display OS bad tracks

SA:
```

The following is a brief explanation of the tests:

0) Recalibrate
Causes the drive to recalibrate its track counter by issuing the restore command to the controller; it then waits until the heads reach track zero.

1) Quick confidence read
Seeks and reads tracks in the following sequence: track zero, last track, track zero. This is a quick check of drive and controller functions.

2) Read entire OS disk
Reads the entire disk sequentially from track zero to the last track.

3) Random read OS disk
Reads tracks picked at random.

4) Ping-pong read OS disk
Reads the entire disk in the following sequence: from track zero to last track, from track one to second to last track, from track two to third to last track, and so on.

d) Display bad track list
Reads and displays the bad track list from the disk.

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Floppy Disk Tests

Some of these tests destroy the data on the scratch floppy disk. You must format all floppy disks for these tests using System V/68 or the SSID format test, selection "f"; they do not need bad track support. Since the first track is formatted by the operating system to single density, this track is not used in any of the floppy tests.

```
SA: fd.0 <CR>
                    (The following menu displays for fd.0 and fd.1)

Selections for Test "Floppy Disk"    (write-enabled scratch floppy disk required)

    0) Recalibrate
    1) Quick confidence read
    2) Read entire OS Disk
    3) Random read Disk
    4) Ping-pong read Disk
    p) Partial W/R DESTRUCTIVE
    w) Fully W/R DESTRUCTIVE
    f) Format Disk
SA:
```

For a description of tests 0 through 4, refer to the previous section, *Winchester Disk Tests*. Tests p, w, and f are described below:

p) Partial W/R DESTRUCTIVE
Writes a pattern, reads it back, and verifies the pattern on a small number of tracks.

w) W/R DESTRUCTIVE
Writes a pattern, reads it back, and verifies the pattern on every track except the first track.

f) Format Disk
Formats the entire disk (including the first track) based on the variables found in the floppy disk configuration. The following section, *MVME320 Board Test Configuration*, shows the default 655K floppy disk configuration. Refer to the **cf** command, Example 4, in Appendix A for information on how to change the floppy disk configuration to accommodate 1.2Mb floppy disks.

MVME320 Board Test Configuration

The MVME320 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 320.0
/bdtest/320.0 configuration
   base[%0x400] = 0xffffb000 ?              #  base address
   am[0x0d,0x3d] = 0x3d ?                    #  address modifier
   level[0-7] = 5 ?                          #  default interrupt level
   data bus width[b,w,l] = l ?              #  date bus width (byte, word, long)
   type 0Micropolis 1Toshiba[0,1] = 0 ?    #  type of hard disk
   fd[0-2] = 2 ?                            #  number of floppy disks
   hd[0-2] = 2 ?                            #  number of hard disks

> cf 320.0/hd.0
/bdtest/320.0/hd.0 configuration
   Drive type[MICR] = MICR ?                #  drive type Micropolis
   Micropolis-phy-drive[0-1] = 0 ?         #  hard disk drive number
   M-test type[r,w] = r ?                   #  read only test or
   M-sector/xfer[1,2,4,8,16,32] = 32 ?     #  size per buffer
   M-retries[0-20] = 4 ?                    #  retry count
   M-step rate(ms) = 0 ?                    #  step rate
   M-recal step rate(ms) = 5 ?             #  recalibrate step rate
   M-format with[ECC,CRC] = ECC ?          #  ECC or CRC
   M-buffered[y,n] = y ?                    #  drive buffered
   M-post data gap =0xf ?                   #  post data gap
   M-addr mark cnt = 1 ?                    #  address mark count
   M-sectors/track = 32 ?                   #  number of sectors per track
   M-tracks/cylinder = 8 ?                  #  number of tracks per cylinder
   M-cylinders/drive = 1024 ?              #  number of cylinders per drive
   M-sector size[128,256] = 256 ?          #  number of bytes per sector
   M-interleave factor[1-16] = 3 ?         #  interleave factor
   M-precomp track = 1025 ?                #  precompensation
   M-low wrt current trk = 512 ?           #  low write current
   M-concurrent[y,n] = y ?                  #  allow concurrent, no lock
   Drive type[TOSH] = TOSH ?               #  drive type Toshiba
   Toshiba-phy-drive[0-1] = 0 ?            #  hard disk drive number
   T-test type[r,w] = r ?                   #  read only test or
   T-sector/xfer[1,2,4,8,16,32] = 32 ?     #  size per buffer
   T-retries[0-20] = 4 ?                    #  retry count
   T-step rate(ms) = 0 ?                    #  step rate
   T-recal step rate(ms) = 5 ?             #  recalibrate step rate
   T-format with[ECC,CRC] = ECC ?          #  ECC or CRC
   T-buffered[y,n] = y ?                    #  drive buffered
   T-post data gap =0xf ?                   #  post data gap
   T-addr mark cnt = 1 ?                    #  address mark count
   T-sectors/track = 32 ?                   #  number of sectors per track
```

```
    T-tracks/cylinder = 10 ?              # number of tracks per cylinder
    T-cylinders/drive = 830 ?             # number of cylinders per drive
    T-sector size[128,256] = 256 ?        # number of bytes per sector
    T-interleave factor[1-16] = 3 ?       # interleave factor
    T-precomp track = 512 ?               # precompensation
    T-low wrt current trk = 0 ?           # low write current
    T-concurrent[y,n] = y ?               # allow concurrent, no lock
> cf 320.0/fd.0
/bdtest/320.0/fd.0 configuration   (for a 655K floppy disk)
    phy-drive[2-3] = 2 ?                  # floppy drive number
    test mode[r,w] = r ?                  # read only test or
    sector/xfer[1-16] = 16 ?              # size per buffer
    retries[0-20] = 10 ?                  # retry count
    step rate(ms) = 3 ?                   # step rate
    post data gap = 0x36 ?                # post data gap
    addr mark cnt = 3 ?                   # address mark count
    size(inch)[5,8] = 5 ?                 # 5-1/4 inch or 8 inch
    sides[1,2] = 2 ?                      # number of sides
    no of cylinder = 80 ?                 # number of tracks per side (DEBUG)
    track density[s,d] = d ?
    no of sector/track = 16 ?
    sector size[128,256,512] = 256 ?      # number of bytes per sector
    interleave factor[1-16] = 1 ?         # interleave factor
    precomp track = 0x50 ?                # precompensation
    low wrt current trk = 0x50 ?          # low write current
> cf 320.0/fd.0
/bdtest/320.0/fd.0 configuration   (for a 1.2MB floppy disk)
    phy-drive[2-3] = 2 ?                  # floppy drive number
    test mode[r,w] = r ?                  # read only test or
    sector/xfer[1-16] = 16 ? 15           # size per buffer
    retries[0-20] = 10 ?                  # retry count
    step rate(ms) = 3 ?    .              # step rate
    post data gap = 0x36 ?                # post data gap
    addr mark cnt = 3 ?                   # address mark count
    size(inch)[5,8] = 5 ? 8               # 5-1/4 inch or 8 inch
    sides[1,2] = 2 ?                      # number of sides
    no of cylinder = 80 ?                 # number of tracks per side (DEBUG)
    track density[s,d] = d ?
    no of sector/track = 16 ?  15
    sector size[128,256,512] = 256 ? 512  # number of bytes per sector
    interleave factor[1-16] = 1 ?         # interleave factor
    precomp track = 0x50 ?                # precompensation
    low wrt current trk = 0x50 ?          # low write current
```

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MVME320 Winchester/Floppy Controller Soft Errors

The MVME320 controller tests are configured to retry four times on soft errors (i.e., Cyclic Redundancy Check (CRC) errors, Identifier not found, Positioning errors, and Throughput errors on Direct Memory Access (DMA) operation). If one of these errors occurs, the test retries the configured number of times until the operation is successful or until the retry count expires, causing a FATAL error to display.

In the case of a CRC error, the controller hardware retries a configured number of times. The SSID software retries on CRC errors only after the controller hardware has retried the configured number of times.

The error counter is incremented after every retry in which a soft error is found; however, the fatal error counter is not incremented if the test completes successfully. Refer to *The clear Command* in Chapter 3 for a sample error display.

MVME323 ESDI Disk Drive Controller

The MVME323 board tests verify controller operation by performing both nondestructive *read only* tests and destructive *write/read/verify* tests on the ESDI Winchester disk drives.

You can install a maximum of one MVME323 controller in a system, with a maximum of four fixed ESDI Winchester drives per controller. You must format the disks to be tested.

The **323.0** directory contains tests for the 323 controller. To run tests on the first ESDI drive, enter **"esdi.0"**; enter **"esdi.1"**, **"esdi.2"**, or **"esdi.3"** to run tests on the second, third, or fourth ESDI drive, respectively. These commands display a menu of tests you can run for this controller.

When a test encounters an error, it displays the command that failed, the logical sector tested, and other information about the controller and drive status.

To access the test menus for the MVME323 controller, type:

        SA: 323.0

A display similar to the following appears:

```
Current Menu is /bdtest/323.0 - "VME323 ESDI Controller Tests"

esdi.3        - ESDI Disk Tests
esdi.2        - ESDI Disk Tests
esdi.1        - ESDI Disk Tests
esdi.0        - ESDI Disk Tests

SA: esdi.0 <CR>    (to access the test selection menu for the first ESDI disk drive)

Selections for Test "ESDI Disk Test"

0) Recalibrate
1) Confidence Test
2) Read Entire Disk
3) Random Read Disk
4) Ping-Pong Read Disk
a) Read Sector Header
b) Controller Check
c) Get uib from Drive
d) Read sector x
e) Calculator
r) Read Disk Descriptor

SA:
```

For a description of tests 0 through 4, refer to the previous section *Winchester Disk Tests*. Menu items **a** through **e** are tools available to isolate disk problems; they are described below:

a) **Read Sector header**
   Displays any arbitrary logical and physical sector number from the current cylinder and head position on the disk.

b) **Controller check**
   Performs transfers between the host and the controller to verify proper controller function.

c) **Get uib from controller**
   Displays the current drive parameters from the unit initialization block.

d) **Read sector x**
Allows the reading of any sector on the disk. It accepts either hexadecimal or decimal input.

e) **Calculator**
Converts logical sector numbers into cylinder, head, physical sector numbers. The calculator works with either hexadecimal or decimal numbers.

The following display shows how the calculator works:

```
/bdtest/323.0/esdi.0   c) Calculator            ........starts
Calculator
1 = logical sector
2 = physical
q = quit
<: 1    (to calculate the logical sector)
An 'e' to exit or Enter Cylinder number : 1 <CR>
An 'e' to exit or Enter Head/Track number : 1 <CR>
An 'e' to exit or Enter Physical sector number : 1 <CR>

Logical sector number = hexadecimal 0x00000169 decimal 361
<: 2    (to calculate physical sector number)
An 'e' to exit or Enter Logical sector number : 1 <CR>

Cylinder number     = hexadecimal 0x00000000 decimal 0
Head/track number   = hexadecimal 0x00000000 decimal 0
Physical sector     = hexadecimal 0x00000001 decimal 1
<: q <CR>
```

r) **Read Disk Descriptor**
Displays device descriptor information for the drive requested.

The following DESTRUCTIVE TESTS are available for hard disks, but you must enter command line mode and execute **cf** to set the "EVAL" flag before you can run these tests on a hard disk:

Fix Bad Spot
This selection includes the following:

- **Fix Bad Spot**
Fixes a bad spot on the disk without reformatting the disk by mapping the track that contains the bad spot to an alternate track. Requires the user to input the physical cylinder and head to be fixed.

Display Grown Defect List
Displays the defect list stored on the disk.

Format Track
Format a specified track.

Map Alternate Track
Map a bad track to an alternate track.

Format Entire Disk
Formats the disk as specified by the disk descriptor parameters using alternate track mapping.

Full W/R DESTRUCTIVE
Sequentially writes a data pattern over the entire disk, then sequentially reads and verifies the pattern.

Set Test Scripts
Allows you to:

- set the last cylinder for testing.

- set the data pattern used for write/read/verify testing.

- set seek or read test mode.

- enable verify option for read testing.

- set the number of random seeks for speed tests.

- modify confid string 5 (Continuous Running Intensive I/O Check) for `esdi.0` to include destructive disk tests. The destructive selection is TOGGLED each time this selection is executed. If destructive mode is enabled, the following message displays:

      CAUTION: Destructive disk tests for drive 0 have been added
               to confidence and fault test scripts!!!

If destructive mode is disabled, the following message displays:

      DRIVE 0 TEST SCRIPTS ARE NOW READ ONLY

Destructive test WARNING messages are disabled during confid 5 testing to allow unattended destructive tests.

Read Sectors From X
Reads the specified number of sectors from the specified position on the disk.

Seek for Speed
Displays the time required to seek randomly on the disk for a specified number of seeks.

The following abbreviations may display during the tests:

CONTROL AND STATUS REGISTER		OTHERS	
sled	status led state	**uib**	unit initialization block
bok	board okay	**iopb**	input/output parameter block
sfdis	sysfail enable	**SSE**	spare sector enable
bdclr	board clear	**CE**	cache enable
berr	bus error enable	**SC_int_on**	status change interrupt
go_busy	board running command		
done	operation done interrupt		
err_last	error last command		

6

MVME323 Board Test Configuration

The MVME323 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
>cf 323.0
/bdtest/323.0 configuration
   base[%0x200] = 0xffffa000 ?          # base address
   am[0x0d,0x3d] = 0x0d ?               # address modifier
   level[0-7] = 4 ?                     # default interrupt level
   dbw[b,w,l] = w ?                     # data bus width (byte, word, long)
   esdi[0-4] = 4 ?                      # number of drives
```

```
                    CAUTION

Setting the  EVAL  Flag variable to  1-on allows
destructive disk testing!
```

```
> cf 323.0/esdi.0
/bdtest/323.0/esdi.0 configuration
   Controller type [ESDI,SMD] = ESDI ?
   phy-drive[0-3] = 0 ?                 # number of hard disk drives
   Alt track 0-no 1-yes[0-1] = 1 ?     # alternate track handling
   sector/xfer[1-128] = 36 ?           # test buffer size
   dma burst[1-255] = 10 ?             # dma burst rate
   start head = 0 ?
   tracks/cylinder = 9 ?               # number of tracks per cylinder
   sectors/track = 36 ?                # number of sectors per track
   spiral skew = 2 ?
```

```
sector size[128,256,512,1024] = 512 ?  # number of bytes in a sector
gap1 = 10 ?
gap2 = 10 ?
interleave factor[1-16] = 1 ?          # interleave factor
retries[0-255] = 3 ?                   # retry count
cylinders/drive = 968 ?               # number of cylinders per drive
attribute = 0x5 ?                      # inc by head, reSeek
format with[ECC,NON] = ECC ?          # format with ECC or without ECC
Eval Flag 0-off 1-on[0-1] = 0 ?       # not recommended for general use
lockout cylinder = 0 ?                # ending range of cylinder tested
lockout logical sector number = 0 ?   # calculated log. position of
                                       # lockout cyl.
read/seek flag 0-read 1-seek[0-1] = 0 ?
read/check flag 0-no 1-yes[0-1] = 0 ?
write data pattern = 0xdb60db6 ?
Max number of random seeks = 10000 ?   # applies to speed test only
Max number of alternate tracks = 144 ? # automatically determined by test
Conf test flag 0-off 1-on[0-1] = 0 ?   # confidence test flat for
                                        # destructive disk tests
```

MVME323 Error Codes

The following MVME323 error codes may be returned while running the MVME323 tests. All error codes are in hexadecimal format.

10 - **Drive not ready**
    The disk ready signal output is tested at the beginning of any command requiring disk data movement. Error 10 is posted if the disk is not ready. This code is typically posted when an attempt is made to access a disk before the MVME323 has received the READY signal for the drive.

11   This error code is not used.

12 - **Seek error - wrong cylinder**
    If the MVME323 cannot find the required sector of data within two revolutions, it tries to verify that the head is on the right track by reading several sectors. If the cylinder number in the header is incorrect, then error 12 is issued (refer to related errors 20 and 2A).

13 - **ECC code discrepancy**
    Issued if the computed ECC on the data did not agree with the ECC appended to the data on the disk, and if no error correction was attempted (refer to related error 23).

14 - **Invalid command code (byte 0 of IOPB)**
    The command code in the IOPB (byte 0) was not valid.

15 – Illegal fetch and execute attempted
Indicates that a Fetch and Execute command was encountered in external memory. A Fetch and Execute command is only valid when it occurs in the onboard Short I/O space.

16 – Sector number too large for drive
The target sector in the IOPB (byte seven) was greater than the capacity of the drive as specified for that drive in byte four of the UIB. This check is performed before the command is executed.

17 – Illegal memory type specified
Either the memory type specified for the buffer address is not zero, two, or three, or the IOPB address is not zero, one, two, or three as required.

18 – Bus not available in < 1 ms
Indicates that bus acquisition was not completed within 100 milliseconds of a request. This error is typically caused by a nonexistent address or address modifier in the data transfer IOPB.

19 – Header checksum error
Indicates that there was an error in the header field.

1A – Disk write protected
Issued when attempts are made to write to a disk that is write protected.

1B – No response from unit on select
Issued when a unit select was made and the unit failed to respond with Unit Selected. This occurs when either the drive unit number is incorrectly selected, the drive is not powered up, or the cable is not properly connected.

1C – No correct seek 3 secs after RESTORE
Occurs when a Clear Fault or Restore failed to correct a seek error from the drive within three seconds. If this error is issued, check to make sure the "B" cable is connected correctly.

1D – Fault not cleared 3 secs after RESTORE
Issued when a Clear Fault or Restore failed to correct a fault condition from the drive within three seconds. If this error is issued, check to make sure the "B" cable is connected correctly.

1E – Drive fault occurred, RESTORE required
Indicates that a fault condition exists in a selected unit. The Fault should be cleared by a Restore command. This error is issued when the drive tries to access a nonexistent head or cylinder. Check the drive manual to ensure that the UIB contains the proper settings.

1F – `Drive not ready 3 secs after RESTORE`
Issued when a Clear Fault or Restore failed to bring the drive ready within three seconds.

20 – `Multi sector I/O exceeded end of media`
Indicates that a multisector transfer exceeded the end of the medium.

21 – `UIB for specified volume contains zeros`
This fault indicates that the volume specified in the IOPB contains zero heads in the UIB. This error is usually caused by an error in the UIB.

22 – `Bad post header pad byte found`
Indicates that an improper post-header pad byte was encountered.

23 – `Failed to fix uncorrectable error`
When this error is posted, error correction was attempted on the data field and the error was found to be uncorrectable.

24 – `Logical sector num -> bad cylinder num`
Indicates that the translation of a logical sector resulted in a bad cylinder number. If the drive's UIB is correct, then the logical sector is invalid.

25 – `Logical sector num -> bad head num`
Occurs when the translation of a logical sector resulted in a bad head number. If the drive's UIB is correct, then the logical sector is invalid.

26 – `Logical sector num -> bad phys sector num`
When posted, this error indicates that the translation of a logical sector resulted in a bad physical sector number. If the drive's UIB is correct, then the logical sector is invalid.

27 – `Data overrun - suspect clock from drive`
Indicates a data timeout error usually caused by a missing TX (transmit) or RX (receive) clock from the drive. If this error is issued, check to ensure the "B" cable is connected correctly. It may also occur if the UIB sectors/track is set to "0".

28 – `No index pulse after 65ms on format cmd`
During a Format operation, the MVME323 looks for the index pulse from the disk drive. If not found within 65 milliseconds, this error is posted.

29 – `Sector not found during read or write`
If the target sector cannot be found during a Read or Write, this error is issued (refer to related errors 12 and 2A). It is also issued if a bad sector on the disk is encountered or if a track is improperly formatted.

6

2A – Head number in header wrong
Issued if the head number read from the disk in the header field was wrong (refer to related errors 12 and 29).

2B – Sync word in data field not valid
Indicates that the first word read from the data field was not a valid sync character.

2C – No valid header found
Indicates that during the Read Header command, no valid header was found. After checking every sector (specified by the UIB) including the runt sector and short sector, every header was invalid. This means that the sync character, checksum, and/or post-header pad were invalid. This error is usually posted when attempting to read a disk that was not formatted for use with the MVME323.

2D – Seek not complete in 500ms
If issued, this error indicates that a seek was made and a normal complete response did not occur within 500 milliseconds.

2E – Drive held by dual port over 500ms
This error is set on a dual ported drive if Busy has been active for more than 500 milliseconds. It indicates that one of the controllers has held the drive too long.

2F – Not on cylinder 3 secs after select
The drive must be on cylinder within three seconds after being selected, or this error results.

30 – Not normal complete 3 secs after RESTORE
Issued when a Restore command was executed but a normal complete did not occur within three seconds.

31 – Sync word in header not valid
An invalid sync character in the header field causes this error code to occur.

32 through 3D
These error codes are not used.

3E – UIB skew factor
Occurs if the skew factor set in the UIB exceeds the sectors per track specified in byte 4 of the UIB (plus any spares specified in byte 13 of UIB).

3F   This error code is not used.

40 – Write or format attempted before INIT_DRV
Indicates that a Write or Format command was attempted on a unit that has not been initialized.

41   This error code is not used.

42 - Specified gap too small - minimum gap is 5
Occurs when the value for either Gap 1 or Gap 2 in the UIB is less than five.

43 through 4A
These error codes are not used.

4B - Seek error reported by drive
Indicates that a seek error was reported by the disk drive.

4C - No sector pulse on track to be mapped
No sector pulse was found and the track cannot be mapped if no sector pulse is present.

4D through 4F
These error codes are not used.

50 - Sectors per track in UIB invalid
Indicates that the number of sectors/track set in the UIB is zero or greater than 160.

51 - Bytes per sector in UIB > buffer size
The bytes per sector are specified in bytes six and seven in the UIB. When the number is less than 256 or greater than 2048, this error is issued.

52 - Invalid interleave in UIB > SPT or 0
If this error occurs, the interleave factor set in byte six of the UIB is either zero or greater than the number of sectors per track. If this error is issued, check to make sure that the UIB pointer in the initialize command is pointing to the correct place in memory. If it is not, a UIB of random data is read during initialization.

53 - Head number in IOPB out of range per UIB
The capacity of the drive is specified in bytes zero through three of the UIB. This error indicates that the target head address in byte six of the IOPB exceeded the capacity of the drive.

54 - Cylinder no. in IOPB out of range per UIB
The capacity of the drive is specified in bytes 12 through 13 of the UIB. This error indicates that the target cylinder in Word two of the IOPB exceeded the capacity of the drive.

55 - ESDI timeout
Occurs if an MVME323 command does not complete within the time limit indicated by the ESDI specification.

56 through 5C
These error codes are not used.

5D - Invalid DMA transfer count
Indicates that the specified transfer count caused the MVME323 to attempt to transfer an odd number of bytes.

5E and 5F
These error codes are not used.

60 - Bus error on external IOPB transfer
When this error is posted, a bus error occurred during the transfer of an external IOPB. The IOPB pointer (Words 10 and 11) shows the starting address of the IOPB on which the bus error occurred. (Refer to error code 61 for details on bus errors during DMA transfers.)

61 - Bus error on DMA transfer
Indicates that a bus error occurred during the DMA transfer of data to or from the buffer or the bus. Words five and six of the IOPB (the buffer address) point to the start of the sector block in system memory where the error occurred. Words two and three of the IOPB (the disk address) point to the disk location where the disk transfers were when the error occurred. If the disk was addressed in physical mode, the disk error location is a physical location. If logical address mode was used, the disk error location is a logical location.

62 - VME buffer address not aligned
For 8- or 16-bit transfers, the starting address of the VME buffer must fall on a word boundary (even address, multiple of two). For 32-bit transfers, the starting address of the VME buffer must fall on a long word boundary (even address, multiple of four).

63 through 69
These error codes are not used.

6A - Unrecognized header field
During a requested read/verify command, one or more of the requested headers were not found. This error differs from error 29 (SECTOR NOT FOUND) in that one or more headers were ignored because of invalid sync, checksum, or post-header pad fields. Possible causes could include unformatted sectors (UIB sectors/track less than disk sectors/track), UIB Gap one too small, or "short sector" pulse from drive.

6B - Mapped header error
Indicates that the sync field of a header appeared to be a valid mapped field, but the remainder of the header was unrecognizable. Refer to Error code 6A for probable causes.

6C through 6D
These error codes are not used.

6E – UIB indicates no spares enabled

Indicates that the spare sector number to be mapped is beyond the end of the track. The spare sector number must be less than the number of sectors/track.

6F – UIB indicates no spares enabled

A Map Sector command was issued and the UIB did not specify spare sector mapping.

70 through 76

These error codes are not used.

77 – Command aborted

Indicates the MVME323 observed and serviced the ABORT bit in the CSR.

78 – ACFAIL detected

Indicates the MVME323 received the VME ACFAIL control signal. This error requires a Reset and ACFAIL release before normal operation can continue.

79 through 7F

These error codes are not used.

80 – Transfer assertion timeout

The ESDI command transfer acknowledge signal was not returned within the specified time limits.

81 – Transfer release timeout

The ESDI command transfer release signal was not returned within the specified time limits.

82 – Status transfer timeout

The ESDI status transfer acknowledge signal was not returned within the specified time limits.

83 – Status release timeout

The ESDI status release acknowledge signal was not returned within the specified time limits.

84 through 9F

These error codes are not used.

A0 – S/G list too large

The Scatter/Gather list size exceeds the sector size. This list cannot be larger than a sector buffer. List size is calculated by multiplying the list element size (eight bytes) by the number of elements specified in byte 27 of the IOPB.

A1 – Illegal element byte count
For Scatter/Gather commands (A1 and A2), the element byte count must be a multiple of the bytes/sector parameter. If an illegal element byte count is specified, this error is returned by the Scatter/Gather commands code.

A2 through AA
These error codes are not used.

AB – Illegal element size
All Scatter/Gather elements must contain an even number of bytes. The controller cannot transfer less than a word; therefore, if an element contains an odd number of bytes, this error is returned.

AC – Illegal list byte count
The total byte count specified by the Scatter/Gather list must be a multiple of the bytes/sector parameter. The controller will not complete a Scatter or Gather command with partial sectors, and this error is returned.

AD – Illegal IOPB sector count
The IOPB sector count does not agree with the total bytes specified in the Scatter/Gather list.

AE through BF
These error codes are not used.

C0 – Both bits set
Returned if both the Spare Sector Enable bit and the Multiple Spare Enable bit are set.

C1 – MSE without init long
Returned if the Multiple Spare Enable bit is set and the unit is not Initialized with the Initialize Long command (7C).

C2 through EF
These error codes are not used.

F0 – Mapped header
A mapped bad header was encountered on the current track.

F1 – Sector not flagged
The sector to be transferred was not flagged as error 29 in sector ID table (rdeach @ rdca100:).

F2 through FB
These error codes are not used.

FC – No write list
No write list was available to start gather operation.

FD - **No write buffers**
   No write buffers were available for gather operation.

FE - **Out of buffers**
   All buffers were full before gathered data could be transferred.

FF - **Command not implemented**
   The command issued will be supported in a later release.

XX - **Unexpected error code** XX
   This is any error code not defined above that might occur due to erroneous operation. Contact your sales or field service representative for assistance.

MVME327 SCSI Disk Drive Controller

6

The MVME327 board tests verify controller operation by performing the following types of tests:

The SCSI tape tests verify SCSI tape controller operation by performing write and read tests on the SCSI tape drives.

The SCSI hard disk tests verify SCSI disk controller operation by performing nondestructive, read-only tests on the SCSI hard disk drives. The SCSI disks to be tested must be initialized (formatted or have an operating system file system on them). Refer to the operating system documentation for information on formatting.

CAUTION

Do Not use the format command in the SCSI test to format the drive. This test is for factory use only.

The local floppy disk tests verify local disk controller operation by performing nondestructive, read-only tests on the local floppy disk drives. The local floppy disks to be tested must be initialized (formatted or have an operating system file system on them). Refer to the operating system documentation for information on formatting or select the format test from the floppy drive menus.

To access the test menus for the MVME327 board, type:

   SA: 327.0

MASS STORAGE DEVICE CONTROLLER BOARD TESTS

A display similar to the following appears:

```
Current Menu is /bdtest/327.0       - VME327 SCSI Tests
/bdtest/327.0/flop.1                - 327 Floppy Disk
/bdtest/327.0/flop.0                - 327 Floppy Disk
/bdtest/327.0/scsi6                 - 327 SCSI Ctrlr 6 LUN 0 Tests
/bdtest/327.0/scsi5                 - 327 SCSI Ctrlr 5 LUN 0 Tests
/bdtest/327.0/scsi4                 - 327 SCSI Ctrlr 4 LUN 0 Tests
/bdtest/327.0/scsi3                 - 327 SCSI Ctrlr 3 LUN 0 Tests
/bdtest/327.0/scsi2                 - 327 SCSI Ctrlr 2 LUN 0 Tests
/bdtest/327.0/scsi1                 - 327 SCSI Ctrlr 1 LUN 0 Tests
/bdtest/327.0/scsi0                 - 327 SCSI Ctrlr 0 LUN 0 Tests
```

SA: flop.0<CR> *(to access the test selection menu for the first floppy drive)*

Selections for Test "327 Floppy Disk"
(write-enabled scratch floppy required)

0) **Recalibrate** *(reads sector zero on the disk)*
1) **Confidence test** *(reads last sector, then first sector)*
2) **Read entire Disk** *(reads every sector on the disk)*
3) **Random read Disk** *(randomly reads most sectors on the disk)*
4) **Ping-Pong read Disk** *(reads start, then end, then start + 1, the end - 1, etc.)*
r) **Read a Sector** *(allows reading of any sector; accepts hexadecimal or decimal input)*
w) **Write All Sectors (DESTRUCTIVE)** *(write all sectors on floppy)*
f) **Format Floppy (DESTRUCTIVE)** *(format floppy)*

SA: scsi0<CR> *(to access the first SCSI hard disk test)*

Selections for Test "327 SCSI Ctrlr 0 LUN 0 Tests"

0) **Recalibrate** *(reads sector zero on the disk)*
1) **Confidence test** *(reads last sector, then first sector)*
2) **Read entire Disk** *(reads every sector on the disk)*
3) **Random read Disk** *(randomly reads most sectors on the disk)*
4) **Ping-Pong read Disk** *(reads start, then end, then start + 1, the end - 1, etc.)*
r) **Read a Sector** *(allows reading of any sector; accepts hexadecimal or decimal input)*
c) **READ CAPACITY** *(displays drive capacity in sectors)*

```
SA: scsi4<CR>   (to access the first SCSI tape test)

Selections for Test "327 SCSI Ctrlr 4 LUN 0 Tests"
(write-enabled scratch tape required)

0) Init              (returns tape to BOT)
1) Write Log/EOF     (short write test)
2) Read Log/EOF      (short read test; run after Write Log/EOF test)
r) Retension         (fast forward, then rewind the tape)
s) Erase             (remove ALL data from the tape and rewind)
t) Write EOT         (long write test)
v) Read EOT          (long Read test; run after Write EOT test))
g) Confidence Test   (verifies SCSI interface to drive)

SA:
```

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MVME327 Board Test Configuration

The MVME327 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 327.0 /bdtest/327.0 configuration
  base[%0x1000] = 0xfffffa600 ?          # base address
  Scsi ID [0-7] = 7 ?                    # SCSI host id
  level[0-7] = 4 ?                       # default interrupt level
  am[0x0d,0x3d] = 0x0d ?                 # address modifier
  data bus width[b,w,l] = 1 ?            # (byte, word, long)
  flop[0-2] = 2 ?                        # no of floppy disk
```

┌───┐
│   CAUTION   │
│   │
│ For the MVME327 scsi0 - scsi6 do not change │
│ the "EVAL" flag to enable destructive write │
│ tests. These are for factory use only.   │
│ Enabling the write tests allows destruction │
│ of all data on the disk drive.   │
└───┘

```
> cf 327.0/scsi0 /bdtest/327.0/scsi0 configuration
  Ctrlr number [0] = 0 ?                          # scsi controller number
  phy-drive[0-3] = 0 ?                            # drive number
  Eval flag 0-NO write 1-WRITE TESTS[0-1] = 0 ?  # destructive test flag
  Conf test flag Warnings 0-ON 1-OFF[0-1] = 0 ?  # confidence test flag for
                                                 # destructive disk tests
```

NOTE: The default setting is for high density double sided floppy.

```
> cf 327.0/flop.0
/bdtest/327.0/flop.0 configuration
  Ctrlr number[8] = 8 ?                              # controller number
  phy-drive[0-3] = 0 ?                               # floppy drive number
  Eval flag 0-NO write 1-WRITE TESTS[0-1] = 1 ?# destructive test flag
  Conf test flag Warnings 0-ON 1-OFF[0-1] = 0 ?# confidence test flag for
                                                     # destructive disk tests
  test mode[r,w] = r ?                               # read only test or read/write test.
  sector/xfer[1-16] = 16 ?                           # size per xfer
  controller[0-0xff] = 0x27 ?                        # controller type
  peripheral[0-0xff] = 1 ?                           # peripheral type
  heads = 2 ?                                        # number of heads
  fixed/removable[0-1] = 1 ?
  cylinders/drive = 80 ?                             # number of cylinders per drive
  sector size[256,512,1024] = 512 ?                  # bytes in a sector
  logical block size[256,512,1024] = 512 ? # bytes in a sector
  no of sector/track[15-16] = 15 ?                   # number of sectors per track
  hard/soft sector flag = 0 ?
  interleave factor = 0 ?
  format char = 0x4e ?
  retry count = 10 ?                                 # retry count
  step rate = 0x1e ?
  mot(0) or ibm (1) format = 1 ?
* track 0 density[0-1] = 1 ?
* track density[0-1] = 1 ?
* drive density[0-1] = 1 ?
* data rate[0-1] = 1 ?
  fm(0) or mfm(1)[0-1] = 1 ?
  precomp track = 0 ?                                # precompensation
  low wrt current trk = 0 ?                          # low write current
  alt type = 0 ?
  alt num = 0 ?
  ECC flag = 0 ?
  spiral offset = 0 ?
  gap1 = 0 ?
  gap2 = 0 ?
  gap3 = 0 ?
  gap4 = 0 ?
  strategy = 0 ?
  blocking = 0 ?
  skew = 0 ?
  cache = 0 ?

* a 1=high and a 0=low for the above selections.
```

MVME327 Error Codes

The MVME327 test module prints out error messages when unexpected test conditions are detected. If the MVME327 detects an error, the contents of the MVME327 command/status packet and the English translation of the error code both display. The following is a description of the command/status packet and a description of all error messages:

Command/Status Packet

The contents of this packet displays whenever an error or recovered error condition is encountered by the MVME327. The English translation of the error code also displays. The following is a typical example of the packet display:

```
              packet address = 3f8820, ID = flop.0
|cmd|cmd_ctrl|pri_dev|pri_unit|sec_dev|sec_unit|am|dw|pri_addr|
|04 |  00    | 01    | 00     | 00    | 00     |0d|02|00000000|
|sec_addr| count  |sg_count|ctrl0|ctrl1|ctrl2|fatal_err|recover_err|
|003f7820|00000000| 0000   |0007 |0000 |3988 |  01     |   00      |
|additl_err|rcnt|res|err_sadr|term_cnt|stat0|stat1|stat2|
|  0000    | 00 |00 |00000000|00000024|0000 |0000 |0000 |

error: Bad descriptor
```

Each packet field is defined according to the *MVME327 Firmware User's Guide* and described below:

cmd
Command issued to MVME327

cmd_cntrl
Options for cmd

pri_dev
Device type (1=local floppy, 5=SCSI Bus, F=MVME327)

pri_unit
Unit Number (for SCSI upper nibble controller, lower nibble logical unit number, for local floppy 0=floppy 0, 1=floppy 1)

sec_dev
Not used

sec_unit
Not used

am
Address modifier of memory space where the data buffer is located

dw
Data bus width (1=16 bit, 2=32 bit)

6

pri_addr

Primary address command dependent. Refer to individual command description in the the *MVME327 Firmware User's Guide* for usage

sec_addr

Secondary address command dependent. Refer to individual command description in the the *MVME327 Firmware User's Guide* for usage

count

Transfer count dependent. Refer to individual command description in the the *MVME327 Firmware User's Guide* for usage

sg_count

Scatter/Gather count

ctrl0

Optional command parameters

ctrl1

Optional command parameters

ctrl2

Optional command parameters

fatal_err

Fatal error code (0 = no error, refer to table 6-?)

recover_err

Recovered error status (0 = no error recovery attempted, refer to table 6-?)

additl_err

Additional error code/status (0 = no status, refer to table 6-?)

rcnt

Retry count (if retry were required during this operation, this field indicates the number of retries attempted)

res

Not used

err_sadr

Error status address (either the sector address or logical block where the error occurred)

term_cnt

Termination transfer count (the number of bytes successfully transferred)

stat0

Not used

stat1

Not used

stat2

Status Parameter 3 (if fatal error code 1 or 2 is returned, then this status word contains the byte offset where the bad field is located)

Disk Descriptor Packet (for local floppy and SCSI hard disk drives):

```
                Packet address = 3f8820, ID = flop.0
|ctlno|per_type|noheads|fix/remove| nocyls |bytes_sector| log_size|
| 00  |  01    |  02   |    01    |00000050|   0200     |   0200  |
|secs_per_track|res_secs_per_zone|hard/soft|interleave|format_char|
|     0f       |       00        |   00    |    00    |    4e     |
|retry_cnt|step_rate|floppy_format|pre_comp_cyl|reduced_wrt_cyl|
|   0a    |   01    |     00      |    0000    |     0000      |
|alt_type|noalts|ECC_flg|spiral_offset|cyl_skew|cache_entry_size|
|  00    |  00  |  00   |     00      |   00   |      01        |
```

Each packet field is defined according to the *MVME327 Firmware User's Guide* and described below:

ctlno

Controller type (a predefined SCSI controller type code; refer to the *MVME327 Firmware User's Guide* for values)

per_type

Peripheral type (acceptable codes: 1=floppy, 2=hard disk)

noheads

Number of heads on this disk

fix/remove

Fixed/removable media (0=fixed, 1=removable)

nocyls

Number of cylinders the disk contains

bytes_sector

Bytes per sector

log_size

Logical block size

secs_per_track

Logical sectors per track

res_secs_per_zone

Reserved sectors per zone

hard/soft
> Hard/soft sector flag (0=soft, 1=hard)

interleave
> Interleave factor

format_char
> Format init character

retry_cnt
> Retry count

step_rate
> Step rate

floppy_format
> Floppy format (only used by floppy)

pre_comp_cyl
> Pre-compensation cylinder number

reduced_wrt_cyl
> Reduced write current cylinder number

alt_type
> Zone type

noalts
> Number of alternates

ECC_flg
> ECC correction (0=ecc off, 1=ecc on)

spiral_offset
> Spiral offset

cyl_skew
> Cylinder skew

cache_entry_size
> Cache entry size

Tape Descriptor Packet (for SCSI streaming tape):

```
                Packet address = 3f8820, ID = scsi4
|ctlno|per_type|dri_trks|media_trks|ext_write|swab|buffered|res1|
| 00  |  00    |  00    |   00     |   00    | 00 |  00    | 00 |
|phys_bytes|log_size|qic_format|stream_cnt|res2|retry_cnt|
|  0000    |  0000  |  0000    |  0000    | 00 |   00    |
|read_size|write_size|
|  0000   |  0000    |
```

Each packet field is defined according to the *MVME327 Firmware User's Guide* and described below:

ctlno
　　Controller type (a predefined SCSI controller type code; refer to the *MVME327 Firmware User's Guide* for values).

per_type
　　Peripheral type (acceptable codes: 5=streaming tape)

dri_trks
　　Number of drive tracks

media_trks
　　Number of media tracks

ext_write
　　Extend on write flag (0=non-extend, 1=extend)

swab
　　Byte swap flag (0=no byte swap, 1=byte swap)

buffered
　　Buffered mode flag (0=non-buffered, 1=buffered)

res1
　　Not used

phys_bytes
　　Physical bytes per block

log_size
　　Logical block size

qic_format
　　QIC format

stream_cnt
　　Streaming count

res2
　　Not used

retry_cnt
　　Retry count

read_size
　　Minimum read transfer size

write_size
　　Minimum write transfer size

Start/Stop Tape Descriptor Packet (for SCSI start/stop tape):

```
            Packet address = 3f8820, ID = scsi4
|ctlno|per_type|speed|density|buffered|swab|resv0|retry_cnt|
| 00  |  00    | 00  |  00   |  00    | 00 | 00  |   00    |
|phys_bytes|log_size|
| 00000000 |00000000|
```

Each packet field is defined according to the *MVME327 Firmware User's Guide* and described below:

ctlno
   Controller type (a predefined SCSI controller type code; refer to the *MVME327 Firmware User's Guide* for values)

per_type
   Peripheral type (acceptable codes: 6=start/stop tape)

speed
   Speed select code

density
   Density select code

buffered
   Flag 1. Buffered mode flag (0=non-buffered, 1=buffered)

swab
   Flag 2. Byte swap flag (0=no byte swap, 1=byte swap)

res0
   Not used

retry_cnt
   Retry count

phys_bytes
   Physical bytes per block

log_size
   Logical block size

Additional Error Code/Status

The status word is returned in one two formats:

Format 1   The upper byte is nonzero because a request sense (SCSI) command was issued at the request of the target. (A request sense (SCSI) command returns formatted error information about the last SCSI command to the target.) The upper byte contains the FM bit, EOM bit, Illegal Length Indicator (ILI) bit, and sense key (byte 02 of the sense data). The lower byte contains the additional sense code (byte 12 of the sense dta), if available, from the sense data. The additional sense code byte is device dependent. Refer to Table 6-2 for a partial list of these error code definitions.

15	14	13	12	Bits 11-8	Bits 7-0
FM	EOM	ILI	Res	Sense Code	Additional Sense Code

Format 2   The upper byte is clear and the lower byte contains a specific MVME327A fatal error code that is relative to the current fatal error. Refer to Table 6-1 for a list of these error code definitions.

Bits 15-8	Bits 7-0
O	Error Code

Table 6-1. Fatal Error Codes

CODE (HEX)	ERROR DESCRIPTION	NOTES
$00	Good	1
	$01-0F Command Parameter Errors	
$01	Bad descriptor	2,3
$02	Bad command	2,3
$03	Unimplemented command	
$04	Bad drive	3
$05	Bad logical address	3
$06	Bad scatter/gather table	
$07	Unimplemented device	
$08	Unit not initialized	3

Table 6-1. Fatal Error Codes (cont'd)

CODE (HEX)	ERROR DESCRIPTION	NOTES
\$10-1F Media Errors		
\$10	No ID found on track	3
\$11	Seek error	3
\$12	Relocated track error	3
\$13	Record not found, bad ID	3
\$14	Data sync fault	3
\$15	ECC error	3
\$16	Record not found	3
\$17	Media error	3
\$20-2F Drive Errors		
\$20	Drive Fault	3
\$21	Write protected media	3
\$22	Motor not on	3
\$23	Door open	3
\$24	Drive not ready	3
\$25	Drive busy	3
\$30-3F VME DMA Errors		
\$30	VMEbus error	3,4
\$31	Bad address alignment	3
\$32	Bus time-out	3
\$33	Invalid DMA transfer count	3
\$40-4F Disk Format Errors		
\$40	Not enough alternates	3
\$41	Format failed	3
\$42	Verify error	3
\$43	Bad format parameters	3
\$44	Cannot fix bad spot	3
\$45	Too many defects	3

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Table 6-1. Fatal Error Codes (cont'd)

CODE (HEX)	ERROR DESCRIPTION	NOTES
	$80-FF MVME327A Specific Errors	
$80	SCSI error, additional status available	3
$81	Indeterminate media error, no additional information	3
$82	Indeterminate hardware error	3
$83	Blank check (E0D or corrupted WORM)	3
$84	Incomplete extended message from target	3,5
$85	Invalid reselection by an unthreaded target	3,5
$86	No status returned from target	3,5
$87	Message out not transferred to target	3,5
$88	Message in not received from target	3,5
$89	Incomplete data read to private buffer	3
$8A	Incomplete data write from private buffer	3
$8B	Incorrect CDB size was given	3,5
$8C	Undefined SCSI phase was requested	3,5
$8D	Time-out occurred during a select phase	3
$8E	Command terminated due to SCSI us reset	3
$8F	Invalid message received	3,5
$90	Command not received	6
$91	Unexpected status phase	3
$92	SCSI script mismatch	3,5,9
$93	Unexpected disconnect caused command failure	3
$94	Request sense command was not successful	10
$95	No write descriptor for controller drive	7
$96	Incomplete data transfer	3
$97	Out of local resources for command processing	11
$98	Local memory resources lost	
$99	Channel reserved for another VME host	12
$9A	Device reserved for another SCSI device	12
$9B	Already enabled, expecting target response	6
$9C	Target not enabled	6
$9D	Unsupported controller type	7
$9E	Unsupported peripheral device type	7
$9F	Block size mismatch	8

Table 6-1. Fatal Error Codes (cont'd)

CODE (HEX)	ERROR DESCRIPTION	NOTES
$A0	Invalid cylinder number in format defect list	7
$A1	Invalid head number in format defect list	7
$A2	Block size mismatch —nonfatal	8
$A3	Our SCSI ID was not changed by command	13
$A4	Our SCSI ID has changed	6,14
$A5	No target enable has been completed	6
$A6	Cannot do longword transfers	7
$A7	Cannot do DMA transfers	7
$A8	Invalid logical block size	7,8
$A9	Sectors per track mismatch	7
$AA	Number of heads mismatch	7
$AB	Number of cylinders mismatch	7
$AC	Invalid floppy parameter(s)	
$AD	Already reserved	12
$AE	Was not reserved	12
$AF	Invalid sector number	7
$CC	Self Test failed	

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Table 6-1. Fatal Error Codes (cont'd)

NOTES:	
1.	The termination transfer count is always valid for a command that transfers data.
2.	The bad byte is indicated by its offset value in status parameter 3. If the value is -1 ($FFFF), then the bad type is not indicated.
3.	Additional status information may be available in the additional error code/status field of the BPP packet.
4.	VMEbus error address contained in error status address field of BPP packet is currently not valid.
5.	SCSI processing may not have finished. A SCSI bus reset command may need to be executed to put the SCSI bus in a known state.
6.	Target mode only.
7.	Designated parameter is in error.
8.	Block size requested does not correspond to block size of device.
9.	Target device did not behave as indicated by the script in the SCSI specific packet.
10.	Error condition flagged by target device cannot be reported. Probably due to a hardware problem.
11.	Command cannot be executed because local resources required exceed available local resources. Resubmit command when MVME327A is less busy.
12.	Valid for the reserve/release commands.
13.	Set SCSI address command was unsuccessful because at least one SCSI command was in progress.
14.	Set SCSI address command was issued and all pending target wait commands were returned. Set SCSI address command may or may not be successful.

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Table 6-2. Additional Error Codes

HEX VALUE	MESSAGE
00	No additional error code
01	No index/sector signal
02	No seek complete
03	Write fault
04	Drive not ready
05	Drive not defined
06	Track ZERO not found
07	Multiple drives selected
08	Logical unit communications failure
09	Track following error
0A-0F	Reserved
10	ID CRC or ECC error
11	Unrecovered READ error
12	No address mark found for ID field
13	No address mark found for data area
14	No record found
15	Seek positioning error
16	Data synchronization mark error
17	Recovered data with target read retries
18	Recovered data with ECC correction.
19	Defect list error
00	No additional error code
01	No index/sector signal
1A	Parameter overrun —parameter list too long
1B	Synchronous transfer error
1C	Primary defect list not found
1D	All bytes did not compare during a VERIFY command
1E	Recovered ID with ECC correction
1F	Reserved
20	Invalid command operation code
21	Illegal logical block address
22	Illegal function for device type
23	Reserved
24	Illegal field in CDB
25	Invalid LUN
26	Invalid field in parameter list
27	Disk is write protected
28	Medium change
29	Power on or bus device reset
2A	Mode select parameters have changed
2B-2F	Reserved

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Table 6-2. Additional Error Codes

HEX VALUE	MESSAGE
30	Incompatible cartridge
31	Medium format corrupted
32	No defect spare location available
33-3F	Reserved
40	RAM failure
41	Data path diagnostic failure
42	Power on diagnostic failure
43	Message reject error
44	Internal controller error
45	Select/reselect failed
46	Unsuccessful 'soft' reset
47	SCSI interface parity error
48	Initiator detected error
49	Inappropriate/illegal message
4A-4F	Reserved
50-5F	Reserved
60-6F	Reserved
70-7F	Reserved
80-FF	Vendor unique error codes

MVME350 Streaming Tape Controller

The test group for the MVME350 Streaming Tape Controller board consists of the **tp.0** tape tests shown below. Some of these tests destroy the data on the scratch tape.

To access the test menus for the MVME350 Streaming Tape Controller, type:

SA: **350.0**

MASS STORAGE DEVICE CONTROLLER BOARD TESTS

The following display appears:

```
Current Menu is /bdtest/350.0 - "VME350 Streaming Tape Board Tests"

tp.0 - Tape Tests

SA: tp.0 <CR>    (to access the test selection menu)

Selections for Test "Tape Tests"   (write-enabled scratch tape required)

     c) TAS CSR File     (TAS = test and set; CSR = command status register)
     0) Init
     1) Write Log/Eof    (Eof = end of file)
     2) Read Log/Eof
     r) Retension
     s) Erase
     t) Write EOT        (EOT = end of tape)
     v) Read EOT

SA:
```

The tests are described briefly below:

c) TAS CSR File
Uses a TAS instruction to verify that the MVME350 board's CSR is working. If this test fails, the CPU is probably not at the correct revision level.

0) Init
Resets the tape drive and returns the tape to Beginning Of Tape (BOT).

1) Write Log/Eof
Performs a short tape write test.

2) Read Log/Eof
Performs a short tape read test that should be run after test 1 (Write Log/Eof).

r) Retension
Performs a fast forward, then rewinds the tape.

s) Erase
Removes ALL data from the tape.

t) Write EOT
Performs a long tape write test that writes to the end of the tape (EOT).

v) Read EOT
Performs a long tape read test that should be run after test t (Write EOT).

MVME350 Board Test Configuration

The MVME350 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 350.0
/bdtest/350.0 configuration
   base[%0x100] = 0xffff5000 ?          # base address
   block size[%512] = 1024 ?            # logical block size
   tp[0-1] = 1 ?                        # number of streamer
> cf 350.0/tp.0
/bdtest/350.0/tp.0 configuration
   am[0x0d, 0x3d] = 0x3d ?              # address modifier
   level[0-7] = 4 ?                     # default interrupt level
   dbw[b,w,l] = 1 ?                     # date bus width (byte, word,  long)
   no of test block = 150 ?            # number of test blocks
```

MVME355 9-Track 1/2-Inch Tape Controller

These tests verify controller operation by performing tests on Pertec-type interface, 9-track, 1/2-inch tape drives. The tests also verify the operation of the specified tape drive. Some of these tests destroy the data on the scratch tape.

To access the MVME355 9-Track Tape Controller test menu, type:

      SA: 355.0

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MASS STORAGE DEVICE CONTROLLER BOARD TESTS

A display similar to the following appears:

```
Current Menu is /bdtest/355.0 - "VME355 Controller/Drive Test"

ntpd.0 - VME355

SA: ntpd.0 <CR>    (to access the test selection menu)

Selections for Test "VME355"    (write-enabled scratch tape required)

    0) Reset/Initialization
    1) Drive Status
    2) Write to EOT
    3) Write Blocks
    4) Read to EOT
    5) Read Blocks
    6) Write/Read to EOT
    7) Erase to EOT
    8) Rewind to Load Point
    9) Controller Revision Level
    A) Dump Blocks in Hexadecimal/ASCII Format
    B) Move To EOT/Rewind
SA:
```

The number and size of the blocks used in these tests is set in the test configuration file. Refer to *MVME355 Board Test Configuration* below for details. The MVME355 tests are explained below:

0) **Reset/Initialization**

Verifies that communication with the controller can take place. It resets the controller and sets the default unit initialization block. At this point the board-edge LED turns from red to green. The remaining tests in the sequence execute this initialization process provided that no other tape drive(s) is being tested.

1) **Drive Status**

Verifies that the tape drive is online and ready. The remaining tests in the sequence execute this status check of the tape drive before the body of the test is executed.

2) **Write to EOT**

Writes multiple blocks of data to the tape until an EOT error occurs. The diagnostics then report how many blocks of data were written to the tape. The test must start with the tape positioned at the beginning of tape. Upon completion it returns the tape to BOT.

3) Write Blocks

Writes multiple blocks of data until the count is exhausted. Upon completion it returns the tape to BOT.

4) Read to EOT

Reads multiple blocks of data from the tape until an EOT occurs. The diagnostics then report how many blocks of data were read from the tape. The test is dependent on data being present on the tape (refer to **Write to EOT**, above) and must start with the tape positioned at the beginning of tape. Upon completion it returns the tape to BOT.

5) Read Blocks

Reads multiple blocks of data until the count is exhausted. The test is dependent on data being present on the tape (refer to **Write Blocks**, above). Upon completion it returns the tape to BOT.

6) Write/Read to EOT

Writes multiple (256) blocks of 512-byte data in a single write. After the write, the tape is repositioned over the data blocks written. The tape is then read for 256 blocks (512-bytes in length). Next, the data read is compared to the data written; any errors are reported. The above process is repeated until an EOT error occurs. Upon completion it returns the tape to BOT.

7) Erase to EOT

Removes ALL data from the tape. Upon completion it returns the tape to BOT.

8) Rewind to Load Point

Rewinds the tape to the load point (position tape at the beginning of tape).

9) Controller Revision Level

Asks the controller its revision level and revision date, then displays them.

A) Dump Blocks in Hexadecimal/ASCII Format

This option is more a utility than a test. It prompts for the data block on the tape you wish to view. Input may be in decimal or hexadecimal numbers. This function assumes that there is data on the tape at the specified block number. The data displayed is of the hexadecimal/ASCII format dump. The following options are recognized at the block number prompt: **c** – display current block position; **h** – display options list; **q** – exit utility. Pressing the **<RETURN** key causes the utility to rewind to BOT.

B) Move To EOT/Rewind

Moves the tape to the end of tape marker and returns the tape to BOT.

MVME355 Board Test Configuration

The MVME355 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 355.0
/bdtest/355.0 configuration
   base[%0x100] = 0xffff0800 ?          # base address
   am[0x0d, 0x3d] = 0x3d ?              # address modifier
   level[0-7] = 3 ?                    # default interrupt level
   dbw[w,l] = w ?                      # date bus width (word, long)
   ntpd[0-1] = 1 ?                    # number of drives/tests

> cf 355.0/ntpd.0
/bdtest/355.0/ntpd.0 configuration
   physical drive[0-1] = 0 ?           # tape drive number
   dma rate[0-255] = 16 ?             # dma transfer rate
   block size (bytes)[256-131072] = 512 ?  # bytes per block
   number of blocks = 200 ?          # number of blocks
   retries[0-14] = 3 ?               # retry count
   debug[0-1] = 0 ?                  # debug flag
   iopbug[0-1] = 0 ?                 # iopb debug flag
   J1-14[0-1] = 0 ?                  # j1-14, byte 0 of uib
   J1-16[0-1] = 0 ?                  # j1-16, byte 1 of uib
   J1-36[0-3] = 0 ?                  # j1-36, byte 2 of uib
   J1-44[0-2] = 0 ?                  # j1-44, byte 3 of uib
   J2-26[0-2] = 0 ?                  # j2-26, byte 4 of uib
   J2-50[0-2] = 0 ?                  # j2-50, byte 5 of uib
```

MVME355 Error Codes

All error codes are in hexadecimal format.

10 - tape not ready
Tape drive's ready signal output is tested at the beginning of any command requiring tape movement. Error 10 is posted if the tape is not ready.

14 - invalid command code
The command code, Byte 0 in the IOPB, is not valid.

15 - illegal fetch and execute attempted
Indicates that a Fetch and Execute command was encountered in external memory. A Fetch and Execute command is only valid when it occurs in the onboard Short I/O space.

17 - illegal memory type
The memory type specified for the buffer address or IOPB address is illegal.

18 - bus time out
A bus record transfer was not completed within one second after a request.

19 - not used
The command issued may be supported in a later release.

1A - tape write protected
Posted when attempts are made to write to a tape that is write protected.

20 - end of tape
A complete record write was attempted after EOT. No data was transferred.

21 - load point error
A reverse movement command encountered the load point before completion.

23 - uncorrectable error
Error correction was attempted by the tape drive on the data field and the error was found to be uncorrectable.

24 - parity error
While reading data from the tape, a parity error was detected by the controller. This error is not reported when the drive is operated at 800 bpi (NRZI).

25 - read long error
The number of bytes per record requested in a Read operation was less than the number of bytes actually contained in the tape record. Only the number of bytes requested was transferred into system memory. The Residual Record Count field of the IOPB will contain the number of non-transferred records, which includes the record that caused this error. The Residual Byte Count field of the IOPB will contain an approximate count of the bytes in the tape record that were not transferred.

26 - short read error
The number of bytes per record requested in a Read operation was greater than the number of bytes actually contained in the tape record. However, the number of bytes requested were transferred into system memory. Both the Residual Byte Count and the Residual Record Count fields of the IOPB are valid.

42 - signal definition error
An illegal value was specified in one or more of the first 6 bytes of the UIB.

52 - VME bus error
The VMEbus system controller activated the BUS ERROR signal during a transfer by the MVME355.

58 – fifo error

An internal hardware error occurred on the MVME355 causing the data buffer to overflow or underflow. This only happens if the MVME355 cannot access the bus for very long periods of time.

5A – invalid address modifiers

An invalid value (greater than 3F) was detected in the Address Modifier field of the IOPB. The following table lists valid (not reserved) address modifier codes.

Table 6-3. Address Modifier Codes

CODE	FUNCTION
3E	Standard Supervisory Program Access
3D	Standard Supervisory Data Access
3A	Standard Non-Privileged Program Access
39	Standard Non-Privileged Data Access
2D	Short Supervisory I/O Access
29	Short Non-Privileged I/O Access
0E	Extended Supervisory Program Access
0D	Extended Supervisory Data Access
0A	Extended Non-Privileged Program Access
09	Extended Non-Privileged Data Access

All other address modifier codes are undefined.

5B – invalid memory address

An invalid value was detected in the Memory Buffer address field of the IOPB. Only memory addresses starting on word boundaries are supported.

5C – invalid interrupt level

An invalid value was detected in the Interrupt Level field of the IOPB; 1 to 7 are valid values.

5D – illegal DMA burst count

The DMA burst count specified was not within the valid range. Valid values are 8 to 255, or 0 for a VMEbus system using priority arbitration.

61 – DMA failed

A bus error occurred during the DMA transfer of data.

62 – invalid UIB parameter

An invalid parameter was detected in the UIB, other than the first 6 bytes. Errors in the first 6 bytes have an error code of 42.

63 – tape timeout

The specified tape drive did not respond properly to a command in a calculated period of time.

64 - invalid IOPB parameter
An invalid parameter was found in the IOPB, other than the parameters covered by error codes 52 through 5D or 65.

65 - invalid record size
This error is also reported if the Bytes per Record field in the IOPB is larger than the buffer size when a Read or Write Data Buffer command is issued.

66 - illegal transfer size
A tape record size of less than 16 bytes was issued in the IOPB.

67 - illegal erase
An erase command was issued for a drive without the Erase Enable bit set (Bit 5 in the UIB attributes byte) for that drive.

68 - filemark encountered
A filemark was unexpectedly found during a read or a tape movement command.

70 - time out on rewind
The selected drive did not return proper status within 500 milliseconds after the command was issued.

71 - command not accepted
The selected drive did not acknowledge the command from the controller.

80 - command aborted
The Abort bit of the CSR was set during command execution.

FF - command not implemented
The command issued will be supported in a later release.

XX - unknown status
This is any error code not defined above that might occur due to erroneous operation. Contact your sales or field service representative for assistance.

MVME360 SMD Hard Disk Controller

The MVME360 board tests verify controller operation by performing nondestructive, read-only tests on the SMD Winchester disk drives. Write tests are available but destroy any data on the disk.

A maximum of two MVME360 controllers can be installed in a system, with a maximum of two fixed SMD Winchester drives per controller.

MASS STORAGE DEVICE CONTROLLER BOARD TESTS

NOTE

Removable SMDs are not supported.

The drives to be tested must be initialized (formatted or have SYSTEM V/68 file system on them). They can be formatted with or without alternate track mapping. The tests automatically handle the alternate tracks.

To access the test menus for the first MVME360 board, type:

SA: **360.0**

A display similar to the following appears:

```
Current Menu is /bdtest/360.0 - "VME360 SMD Controller Tests"

smd.1 - SMD Disk Test
smd.0 - SMD Disk Test

SA: smd.0 <CR>   (to access the test selection menu for the first SMD disk drive)

Selections for Test "SMD Disk Test"

0) Recalibrate
1) Confidence test
2) Read entire Disk
3) Random read Disk
4) Ping-Pong read Disk
a) Read Sector header
b) Controller check
c) Get uib from drive
d) Read sector x
e) Calculator

SA:
```

For a description of tests **0** through **4**, refer to the section *Winchester Disk Tests*. Menu items **a** through **e** and abbreviations which might appear during testing are described in the section *MVME323 ESDI Disk Drive Controller* above.

MVME360 Board Test Configuration

The MVME369 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 360.0
/bdtest/360.0 configuration
  base[%0x200] = 0xffff0c00 ?        # base address
  am[0x0d, 0x3d] = 0x3d ?            # address modifier
  level[0-7] = 4 ?                   # default interrupt level
  dbw[b,w,1] = w ?                   # date bus width (byte, word, long)
  smd[0-2] = 2 ?                     # number of drives
```

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CAUTION

Testing an SMD drive with the EVAL Flag* variable set to 1-on will allow destruction of all data on the disk drive!

```
> cf 360.0/smd.0
/bdtest/360.0/smd.0 configuration
  Controller type [ESDI,SMD] = SMD ?
  phy-drive[0-1] = 0 ?                        # number of hard disk drives
  Alt track 0-no 1-yes[0-1] = 1 ?             # alternate track handling
  sector/xfer[1-128] = 64 ?                   # size per buffer
  dma burst[1-255] = 10 ?                     # dma burst rate
  start head = 0 ?
  tracks/cylinder = 10 ?                      # number of tracks per cylinder
  sectors/track = 64 ?                        # number of sectors per track
  spiral skew = 0 ?
  sector size[128,256,512,1024] = 512 ?       # number of bytes in a sector
  gap1 = 16 ?
  gap2 = 16 ?
  interleave factor[1-16] = 1 ?               # interleave factor
  retries[0-255] = 3 ?                        # retry count
  cylinders/drive = 823 ?                     # number of cylinders per drive
  attribute = 0x5 ?                           # inc by head, reSeek
  format with[ECC,NON] = ECC ?                # format with ECC or without ECC
* Eval Flag 0-off 1-on[0-1] = 0 ?            # not recommended for general use
```

(The following variables are ignored unless **EVAL Flag** *is set to* **1-on.***)*

```
lockout cylinder = 0 ?                    # ending range of cylinder tested
lockout logical sector number = 0 ?       # calculated log. position of
                                          # lockout cyl.
read/seek flag 0-read 1-seek[0-1] = 0 ?
read/check flag 0-no 1-yes[0-1] = 0 ?
write data pattern = 0xdb60db6 ?
Max number of random seeks = 10000 ?      # applies to speed test only
```

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CHAPTER 7
COMMUNICATION CONTROLLER BOARD TESTS

This chapter describes the board tests available for communication controller boards. Each section describes the tests available for a particular controller board, the board's test configuration, and, in some cases, the error codes associated with the board. For an introduction to board testing, refer to *Board Testing* in Chapter 4.

MVME330 Local Area Network Controller

There are two versions of the MVME330 board:

G330   Generic Support Package
with Buffer Pipe Protocol/Common Environment (BPP/CE) firmware

T330   Transmission Control Protocol/Internet Protocol (TCP/IP)

G330 and T330 use the same tests but different downloading protocols. G330 follows BPP for downloading, while T330 downloads test codes to dual access RAM from host.

COMMUNICATION CONTROLLER BOARD TESTS

To access the test menus for the Generic Support Package version of the MVME330 board, type:

    SA: **G330.0**

The following display appears for a G330 board.

```
Current Menu is /bdtest/G330.0 - "VME330 GSP LAN Board Test"

gsplan.0 - Ethernet GSP LAN Test

SA: gsplan.0 <CR>      (to access the test selection menu)

    0)   LANCE CSR           (LANCE = Local Area Network Controller for Ethernet)
    1)   LANCE Init
    2)   LANCE Internal Loopback
    a)   External Loopback    (Connect MVME330 to Ethernet coax via transceiver/tap)
    b)   Board Status Check

SA:
```

The following describes the MVME330 tests:

0) **LANCE CSR**
   Checks each bit in the four command status registers, making sure that each bit can be cleared and set.

1) **LANCE Init**
   Tests the initialization of the LANCE chip with interrupt enabled and disabled. It also verifies that an interrupt is received when initialization is finished.

2) **LANCE Internal Loopback**
   Transmits and receives data between two points within the LANCE chip.

a) **External Loopback**
   Transmits to and receives data from the Ethernet cable. The LAN board must be connected to Ethernet coax via transceiver/tap to run this test.

b) **Board Status Check**
   A quick confidence check which ensures that there is some kind of board activity.

G330 Board Test Configuration

The G330 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf G330.0
/bdtest/G330.0 configuration
    base[%0x1000] = 0xdc1000 ?            # base address
    am[0x0d,0x3d] = 0x3d ?                # address modifier
    gsplan[0-1] = 1 ?                     # lan test, can only be one

> cf G330.0/gsplan.0
/bdtest/G330.0/gsplan.0 configuration
    local status = 0xdc2806 ?            # local status location
    local command = 0xdc2805 ?           # local command location
    interrupt location = 0xddfe00 ?      # interrupt location
    xfer size = 1024 ?                   # buffer size
```

T330 Board Test Configuration

The T330 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf T330.0
/bdtest/T330.0 configuration
    base[%0x1000] = 0xde1000 ?            # base address
    am[0x0d,0x3d] = 0x3d ?                # address modifier
    tcplan[0-1] = 1 ?                     # lan test, can only be one

> cf T330.0/tcplan.0
/bdtest/T330.0/tcplan.0 configuration
    local status = 0xde2806 ?            # local status location
    local command = 0xde2805 ?           # local command location
    interrupt location = 0xdffe00 ?      # interrupt location
    xfer size = 1024 ?                   # buffer size
```

MVME331 and MVME332 Asynchronous Communications Controller

These tests check all port pairs on the MVME331 and MVME332 communication boards. The MVME332 has four port pairs; the MVME331 has three port pairs. Loopback cables are required and should be connected as follows:

```
MVME331 :    SP5 <------> SP6
             SP3 <------> SP4
             SP1 <------> SP2
MVME332 :    SP7 <------> SP8
             SP5 <------> SP6
             SP3 <------> SP4
             SP1 <------> SP2
```

COMMUNICATION CONTROLLER BOARD TESTS

See Figure 4-1 for the proper pin out for the loopback cables.

To access the test menus for the first VME332 8-port communication board, type:

    SA: 332.0

The following display appears:

```
Current Menu is /bdtest/332.0 - "VME332 8 Port Comm. Board Test"

sp.3                - Serial Port Pair
sp.2                - Serial Port Pair
sp.1                - Serial Port Pair
sp.0                - Serial Port Pair

SA: sp.0 <CR>   (to access the test selection menu for the communication ports SP1 and SP2)

            0)  ext loop back
            1)  single char loop back
            2)  break detection
            3)  abort read
            4)  abort write/read
            5)  echo
            6)  full duplex
            7)  overrun
            8)  parity error
            9)  hw flow control
            a)  frame error
            b)  Board alive check      (No loopback cable required for tests b, c, or d)
            c)  String output to device (Do NOT run with loopback cable connected.)
            d)  Display EIA status

(This menu is displayed for all communication port pairs on the MVME331 and MVME332 boards.)

SA:
```

A description of the MVME331 and MVME332 tests follows.

0) ext loop back
1) single char loop back
Transmit and receive data between two ports; the tests write to the second port and read from the first port, then write to the first port and read from the second port. Test 0 transmits and receives a block of characters; test 1 transmits and receives a single character.

2) break detection
Forces a break in the line and then waits for a break detect message to be received.

3) abort read
4) abort write/read
Ensure that the read and write/read processes abort on cue.

5) **echo**
Tests the ability of the port to transmit information it receives.

6) **full duplex**
Similar to tests 0 and 1, this test checks that data can be transmitted to and received at both ports simultaneously.

7) **overrun**
Ensures that the controller can detect an overrun error.

8) **parity error**
Generates a parity error on one port, then checks if it is detected by the other port.

9) **hw flow control**
Checks the hardware signals that control data.

a) **frame error**
Generates the wrong baud rate to ensure that the controller can detect a frame error.

b) **Board alive check**
This quick confidence check verifies that there is board activity.

c) **String output to device** *(Do not run with loopback cable connected.)*
This menu-driven test ensures that data is output to the selected device. It is useful for checking transmission of characters to printers or terminals connected to the MVME331 or MVME332 board. This option displays the string it will output on the test console, then sends the string to the selected port.

d) **Display EIA status**
Displays the Electronic Industries Association Standard RS-232C signals.

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MVME331 Board Test Configuration

The MVME331 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 331.0
/bdtest/331.0 configuration
   base[%0x100] = 0xffff3000 ?      # base address
   am[0x0d, 0x3d] = 0x3d ?          # address modifier
   level[0-7] = 3 ?                 # default interrupt level
   sp[0-3] = 3 ?                    # number of communication port pairs

> cf 331.0/sp.0
/bdtest/331.0/sp.0 configuration
   src port no[1-6] = 2 ?           # source serial port number
   dest port no[1-6] = 1 ?          # destination serial port number
   xfer size = 1024 ?               # buffer size
   baud rate = 9600 ?               # baud rate
```

MVME332 Board Test Configuration

The MVME332 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 332.0
/bdtest/332.0 configuration
   base[%0x100] = 0xffff6000 ?      # base address
   am[0x0d, 0x3d] = 0x3d ?          # address modifier
   level[0-7] = 3 ?                 # default interrupt level
   sp[0-4] = 4 ?                    # number of communication port pairs

> cf 332.0/sp.0
/bdtest/332.0/sp.0 configuration
   src port no[1-8] = 2 ?           # source serial port number
   dest port no[1-8] = 1 ?          # destination serial port number
   xfer size = 1024 ?               # buffer size
   baud rate = 9600 ?               # baud rate
```

MVME333 Wide Area Network Controller

The MVME333 WAN Controller has three communication ports. Port 1 is the debug port. The MVME333 tests require loopback cables to be connected as follows:

<p style="text-align:center">MVME333 :   SP3 <------> SP5</p>

See Figure 4-1 for the proper pin out for the loopback cables.

To access the test menus for the first MVME333 WAN Controller, type:

SA: 333.0

The following display appears:

```
Current Menu is /bdtest/333.0 - "VME333 WAN Communications Board Test"

sp.0                - Serial Port Pair

SA: sp.0 <CR>   (to access the test selection menu for the communication ports SP3 and SP5)

                (The following menu is displayed for all communication port pairs.)

     0)  hardware flow control
     1)  single char external loopback
     2)  break detection
     3)  parity error
     a)  frame error
     b)  display EIA signal
     c)  board alive check
     r)  reset board
                     NOTE: Only asynchronous mode is tested.

(For test descriptions refer to MVME331 and MVME332 Asynchronous Communications Controller
in this chapter.)

SA:
```

MVME333 WAN Board Test Configuration

The MVME333 WAN board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 333.0
/bdtest/333.0 configuration
   base[%0x100] = 0xffff3800 ?          # base address
   am[0x0d, 0x3d] = 0x0d ?              # address modifier
   level[0-7] = 1 ?                     # default interrupt level
   sp[0-3] = 1 ?                        # number of communication port pairs
> cf 333.0/sp.0
/bdtest/333.0/sp.0 configuration
   controller type [WAN, X_25] = WAN   # controller type
   src port no[1-6] = 5 ?              # source serial port number
   dest port no[1-6] = 3 ?             # destination serial port number
   xfer size = 1024 ?                  # buffer size
   baud rate = 9600 ?                  # baud rate
```

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MVME333X25 X.25 Controller

The MVME333X25 controller has three communication ports. Port 5 is the debug port. The MVME333X25 tests require loopback cables to be connected as follows:

MVME333x :   SP1 <------> SP3

See Figure 4-1 for the proper pin out for the loopback cables.

To access the test menus for the first MVME333X25 controller, type:

SA: x333.0

A display similar to the following appears:

```
Current Menu is /bdtest/x333.0 - "VME333 X.25 Communications Board Test"
sp.0                  - Serial Port Pair
SA: sp.0 <CR>   (to access the test selection menu for the communication ports SP1 and SP3)

               (The following menu is displayed for all communication port pairs.)

        0)   hardware flow control
        1)   single char external loopback
        2)   break detection
        3)   parity error
        a)   frame error
        b)   display EIA signal
        c)   board alive check
        r)   reset board
                       NOTE:  Only asynchronous mode is tested.

(For test descriptions refer to MVME331 and MVME332 Asynchronous Communications Controller
 in this chapter.)
SA:
```

MVME333X25 Board Test Configuration

The MVME333X25 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf x333.0
/bdtest/x333.0 configuration
   base[%0x100] = 0xffff3b00 ?           #  base address
   am[0x0d, 0x3d] = 0x0d ?               #  address modifier
   level[0-7] = 1 ?                      #  default interrupt level
   sp[0-3] = 1 ?                         #  number of communication port pairs
```

```
> cf x333.0/sp.0
/bdtest/x333.0/sp.0 configuration
   Controller type[WAN,X_25] = X_25 ?      # controller type
   src port no[1-6] = 3 ?                   # source serial port number
   dest port no[1-6] = 1 ?                  # destination serial port number
   xfer size = 1024 ?                       # buffer size
   baud rate = 9600 ?                       # baud rate
```

MVME331, MVME332, MVME333, and MVME333X25 Error Codes

The VME33X test module, which covers MVME331, MVME332, MVME333, MVME333X25 but not MVME332XT, prints out pertinent error messages when it detects unexpected test conditions. If the error is detected by the VME33X, the contents of the packet and the English translation of the error code both display. The following is a description of all error messages the test module uses followed by a description of the packet display.

TIMEOUT

The test module prints a timeout message if an event is not accomplished within a predefined time limit. In the VME33X test, the time out occurs when a certain time has elapsed after a command is sent to the VME33X module and the module has not yet responded.

DATA COMPARISON ERROR

Most VME33X tests transmit data through one port and receive from the other port. If the data read differs from the expected data, a data comparison error occurs. The error message is shown below.

```
/bdtest/33X.0/sp.0  At address=001aff00, expect=44, read=00
```

This message means that a data comparison error occurred on serial port pair, logical number 0. The address of the data in error is at location 001aff00, the expected value of the data is 44, and the actual data read is 00.

OTHER ERRORS

The following table lists the status codes that the VME33X returns through the stat field in packet.

Table 7-1. Status Code List

CODE	STATUS
$00	Normal command termination
$01	End of system memory block
$02	Read timeout
$03	Write timeout
$04	Command aborted
$05	Insufficient local memory
$06	Invalid item number
$07	Invalid baud rate
$08	Invalid number of bits per character
$09	Invalid number of stop bits
$0A	Invalid type of parity
$0B	Invalid handshake selection
$0C	RX queue overrun
$0D	Invalid delete character string length
$10	Invalid start address
$14	Least number of characters received
$81	Parity error
$82	Overrun error
$83	Overrun and parity error
$84	Framing error
$85	Overrun and framing error

Status Packet Display

To provide sufficient status information, the contents of the packet display when there is an error status returned by the VME33X. The packet is also displayed when there is a data comparison error detected by the test. The English translated error code in the main status and the extended status fields display after the packet display. You can also force this packet to display every command and status with or without error by typing **set dp** in command line mode (refer to Appendix A). To clear the flag, type **set -dp**. Figure 7-1 is a typical example of the packet display.

```
             Packet address = 1f9aa8, ID = sp.0
|   flnk   |cmd |port|   saddr  |   len    |stat|term|  rlen   |
|ffffffff|01  | 01  |000187b8|00000400| 0c  | 00  |00000010|

error:  Rx queue overrun
```

Figure 7-1. Packet Display

The message after **error:** is interpreted directly from the status returned by the controller. Each field of the packet display is defined according to the *MVME332 Intelligent Communication Controller User's Manual*. These terms are described as follows:

flnk   is one longword that is used internally by the VME33X firmware for packet linking purposes. **flnk** does not need to be set nor monitored by the host.

cmd   is one byte set by the host. **cmd** is a code number that specifies the command. Valid command codes are **$01** to **$07** and **$0B** to **$13**. Refer to the *VME33X User's Manual* for the command definition.

port   is one byte set by the host. **port** is a number that specifies the serial port affected by the command. Valid **port** numbers are **$01** to **$06** for the MVME331 and **$01** to **$08** for the MVME332.

sad   is one longword (4 bytes) set by the host. **sad** defines the start address of a data area in system memory for command use. Such data may be characters to be transmitted or received, configuration tables, or other additional command parameters. Valid start addresses are any system RAM addresses accessible by the controller.

len   is one longword set by the host. **len** defines the size of a data area in system memory for command use. Such data may be characters to be transmitted or received, configuration tables, or other additional command parameters. The sum of **sad** and **len** must not exceed the system RAM addresses accessible by the communications controller. The maximum value for **len** is **$7fffffff**.

stat   is one byte returned by the VME33X. **stat** is a status code number that is zero when the command has been completed successfully. In the case of abnormal terminations, **stat** indicates the condition that aborted the command. Refer to the *VME33X User's Manual*.

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term   is one byte returned by the VME33X. **term** is used with the read and write commands and is the character that caused command termination. **term** can be the previously defined terminating character or the bad character in the case of a parity or framing error.

rlen   is one longword returned from the VME33X. **rlen** is used by commands that involve the transfer of data to or from system memory. **rlen** is the number of bytes read from or written to system RAM at the time of command termination. In the case of abnormal command terminations, **rlen** can be used by the host to update the **sad** and **len** fields, and to reissue the command that continues the previous aborted operation.

Non-Fatal Errors

SSID records both fatal and non-fatal errors. To see the error count, use the **fe** command in command mode (refer to Appendix A). The non-fatal errors are the errors that could be corrected by software retry. In the case of the VME33X, all errors are considered fatal errors.

Fatal Errors

Fatal errors are hard, non-recoverable errors. In the VME33X test, all errors are fatal errors and fall into these categories:

- Errors flagged in the status returned by the VME33X.

- Data comparison errors.

- Timeout errors that occur when a packet is not returned by the controller after a certain time.

MVME332XT Asynchronous Communications Controller

These tests check all port pairs on the MVME332XT communication boards. To run these tests, loopback cables are required and should be connected as follows:

```
SP7 <------> SP8
SP5 <------> SP6
SP3 <------> SP4
SP1 <------> SP2
```

See Figure 4-1 for the proper pin out for the loopback cables.

All tests, except the baud rate tests, are executed with the ports set to 38.4K baud.

There is no specific download test provided for the MVME332XT board; however, a download is performed as part of the hardware flow control test, providing a check of the download capability of the board.

To access the test menus for the first MVME332XT communication board, type:

> SA: **x332.0**

The following display appears:

```
Current Menu is /bdtest/x332.0 - "VME332xt Async Comm"
sp.3              - Serial Port Pair
sp.2              - Serial Port Pair
sp.1              - Serial Port Pair
sp.0              - Serial Port Pair
SA: sp.0 <CR>   (to access the test selection menu for the communication ports SP1 and SP2)

    1)   open port a              a)  DCD a -> b
    2)   open port b              b)  DCD b -> a
    3)   loopback a -> b          c)  baud rate a -> b
    4)   loopback b -> a          d)  baud rate b -> a
    5)   full duplex              e)  parity a -> b
    6)   event a -> b             f)  parity b -> a
    7)   event b -> a             g)  frame a -> b
    8)   break a -> b             h)  frame b -> a
    9)   break b -> a             i)  HW flow ctl a -> b
                                  j)  HW flow ctl b -> a

This menu is displayed for all communication port pairs on the MVME332XT boards.
SA:
```

A description of the MVME332XT tests follows.

1) **open port a**
2) **open port b**
   These tests open and then close a port as a simple *board alive* check.

3) **loopback a -> b**
4) **loopback b -> a**
   Transmit and receive data between two ports, comparing the results.

5) **full duplex**
   Checks that data can be transmitted to and received at both ports simultaneously.

6) `event a -> b`
7) `event b -> a`
   Verify that the ports return the correct event packets when interrupt and quit signals are received. Event packets are used for communication between the operating system and the MVME332XT board.

8) `break a -> b`
9) `break b -> a`
   Force a break in the line and verify a 'break detect' message is received.

a) `DCD a -> b`
b) `DCD b -> a`
   Cause DCD to be negated on one port and verify that the other port detects the loss of DCD.

c) `baud rate a -> b`
d) `baud rate b -> a`
   Verify each port at baud rates of 50, 75, 110, 300, 1200, 2400, 4800, 9600, 19.2K, and 38.4K.

e) `parity a -> b`
f) `parity b -> a`
   Generate a parity error on one port and check to see if it is detected by the other port.

g) `frame a -> b`
h) `frame b -> a`
   Set one port to 4800 baud and the other to 9600 baud, transfer data from one port to the other, and verify that a framing error is detected.

i) `HW flow ctl a -> b`
j) `HW flow ctl b -> a`
   Set each port to use hardware flow control, transfer data from one port to the other, and compare the results.

MVME332XT Board Test Configuration

The MVME332XT board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf x332.0
/bdtest/x332.0 configuration
   base[%0x10000] = 0xff780000        # base address
   am[0x0d, 0x3d] = 0xd               # address modifier
   level[0-7] = 2                     # default interrupt level
   sp[0-4] = 4                        # number of communication port pairs
```

```
> cf x332.0/sp.0
/bdtest/x332.0/sp.0 configuration
    port a no[0-7] = 0          # serial port number
    port b no[0-7] = 1          # serial port number
    xfer size[0-2000] = 1024    # buffer size
```

MVME332XT Error Messages

`ring buffer allocation exceeds 64k`

The ring buffer allocation exceeds the available MVME332XT dual ported RAM area of 64K.

`Initialization error`

Board initialization was unsuccessful.

`TIMEOUT`

A time out has occurred. This could happen if a packet is sent to the MVME332XT, but the expected status packet is not returned within a certain period of time.

`port open timeout`

A serial port open command is sent to the MVME332XT, but no response is received within a certain period of time.

`dev never ready`

A serial port is expected to have DCD asserted status from the MVME332XT, but DCD is never asserted.

`Free packet pool is empty`

The test requests a free packet but none is available. This could happen if there is memory corruption.

`DCD did not NEGATE`

DCD is expected to be negated on a serial port, but it is not.

`DCD did not ASSERT`

DCD is expected to be asserted on a serial port, but it is not.

`not enough memory`

There is not enough system memory available for the test to use. This could be a real memory shortage or memory corruption.

`no INTR event`

An INTR event is expected from a serial port, but the INTR event is never reported by the MVME332XT event packet.

no QUIT event
A QUIT event is expected from a serial port, but the QUIT event is never reported by the MVME332XT event packet.

missing BRK INTR
A break interrupt is expected from a serial port, but the MVME332XT never reported one.

cannot execute downloaded code
A piece of code is downloaded to the MVME332XT for execution, but the MVME332XT detected an error and the code was not executed successfully.

parity mark did not work
The parity mark option is selected, but the MVME332XT did not mark parity as expected when a parity error occurs.

at addr=*xxxxxxxx*, expect=*xxxxxxxx*, read=*xxxxxxxx*
A data comparison is detected. The location of the error and the expected and read values are displayed.

cannot download code
A piece of code is downloaded to the MVME332XT dual ported memory, but the download was not successful.

Board does not exist
The host accesses the MVME332XT and a bus error occurs.

board init timeout
An initialization packet is sent to the MVME332XT, but no status is returned after an extended period of time.

Controller never ready
The MVME332XT indicates in its CSR space that the controller is never ready.

create channel failed
The buffer pipe communication channel between the MVME332XT and the host cannot be established. This could happen if: 1) the controller is never ready, 2) the channel establishment protocol is never completed between the host and the MVME332XT, or 3) a bad status is reported by the MVME332XT.

init packet failed
The initialization packet is sent to the MVME332XT, but the initialization was not successful.

board stay busy
The MVME332XT CSR indicates that the board is staying busy. If the BUSY bit stays set, it will prevent the host from establishing a buffer pipe channel for host and MVME332XT communication.

TAS never ready
> The MVME332XT CSR indicates that the board always has its TAS (test and set) bit set. If the TAS bit stays set, it will prevent the host from establishing a buffer pipe channel for host and MVME332XT communication.

wait for VSTAT timeout
> The MVME332XT VSTAT bit in its CSR is not set during channel creation. This indicates that the MVME332XT is not able to complete the channel creation protocol due to board malfunction.

channel bad status
> The channel creation was not successful. The channel is created so that the host and the MVME332XT can communicate through it.

MVME335 Asynchronous Communications Controller

The MVME335 Asynchronous Communications Controller tests allow for testing of both duarts (dual universal asynchronous receiver/transceivers) and the printer port.

The MVME335 Serial Port Duart tests 3 through 8 require loopback cables connected as follows:

```
SP3 <------> SP4
SP1 <------> SP2
```

See Figure 4-1 for the proper pin out for the loopback cables.

Some MVME335 Line Printer tests require a loopback jumper plug on the 36-Pin printer port connector. The printer port loopback connector pin out is as follows:

Pin #	to	Pin #
1	<------>	10
2	<------>	13
3	<------>	11
4	<------>	32
5	<------>	12

Figure 7-2. 36-Pin Printer Port Loopback Connector Pin Out

To access the test menus for the first MVME335 board, type:

SA: 335.0

A display similar to the following appears:

```
Current Menu is /bdtest/335.0 - "VME335 Quad SIO W/Printer Tests"
spd.1          - 335 Serial Port Duart
spd.0          - 335 Serial Port Duart
lp             - 335 Line Printer

SA: spd.0 <CR>  (to access test selection menu for the first duart connected to serial ports 1 & 2)

Selections for Test "335 Serial Port Duart"
(This menu is the same for both MVME335 port pairs.)

    0) Registers
    1) Internal-loop
    2) Baud Rate
    3) Parity Error      (Loopback cable required for tests 3 through 8)
    4) External-loop
    5) Rx intr
    6) Tx intr
    7) Interface intr
    8) Framing Error

SA: lp  (to access the MVME335 line printer test selection menu)

Selections for Test "335 Line Printer"

    0) Registers
    1) Printer loop
    2) Printer Intr
    o) Printer Output

SA:
```

The following describes the serial port duart and line printer tests:

Serial Port Duart Tests

0) **Registers**
   Writes and reads a pattern to verify the chip's bus interface.

1) **Internal-loop**
4) **External-loop**
   These tests program the duart to enter internal or external loopback mode. The tests then transmit, receive, and compare a pattern. The external-loop test requires a loopback cable.

2) **Baud rate**
   Programs the duart to enter internal loopback mode. The test then transmits, receives, and compares a pattern at all selectable baud rates, thereby verifying that all baud rates are working.

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3) **Parity Error**
8) **Framing Error**
   Check the ability of the duart to detect parity errors and framing errors, respectively.

5) **Rx intr**
6) **Tx intr**
   Verify receiver interrupts and transmitter interrupts, respectively.

7) **Interface intr**
   Checks that a CTS (clear to send) status change generates an interrupt.

Line Printer Tests

0) **Registers**
   Writes and reads a pattern to verify the chip's bus interface.

1) **Printer loop**
   Sets bits in the printer port and looks for the associated jumpered status bit to follow.

2) **Printer Intr**
   Verifies that the printer port can generate an interrupt when empty.

o) **Printer Output**
   Sends 95 lines of a 130-column-wide pattern and then sends a form feed to a connected printer. This test requires a compatible, properly configured parallel printer.

MVME335 Board Test Configuration

The MVME335 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 335.0
/bdtest/335.0 configuration
   base [%0x100] = 0xffff3600 ?              # base address
   spd [0-2] = 2 ?                           # serial port duart

> cf 335.0/spd.0
/bdtest/335.0/spd.0 configuration
   xfer size = 512 ?                         # buffer size
   duart [0-1] = 0 ?                         # dual universal async receiver/transceiver
```

MVME336 Delta Link Asynchronous Communications Controller

The MVME336 Delta Link product (also known as SIO/MUX or Serial Input Output/Multiplexer) consists of one MVME336 board or Delta Link hub (SIO) containing global memory, six XPCs (X.25 protocol controllers), and up to six Delta Link servers (MUX). Each server can support up to 16 RS-232 port connections with asynchronous communications.

The MVME336 diagnostics are divided into three parts: gmem, xpc, and mx. The gmem (global memory) tests verify that all of the hub's shared memory is functioning properly. The xpc tests verify that the XPCs' DMA (direct memory access) paths are working. The mx tests verify that the 16 ports on each MUX server are functioning properly. Because the servers take commands from the hub (SIO), they can only be tested (using the mx tests) after the hub's global memory and XPCs are tested and found to be working.

You can test the MVME336 board without a MUX; however, the high speed interface link between the MVME336 and the MUX can only be tested if a MUX is connected.

The MVME336 Delta Link tests require loopback jumper plugs on all 16 of the 25-pin MUX connectors. The MUX Loopback connector pin out is as follows:

Pin #	to	Pin #
2	<------->	3
4	<------->	5
5	<------->	6
8	<------->	20

Figure 7-3. 25-Pin MUX Loopback Connector Pin Out

To access the test menus for the MVME336 board, type:

SA: 336.0

A display similar to the following appears:

```
Current Menu is /bdtest/336.0 - "VME336 XPC/Cluster Tests"

gmem         - 336SIO Global Memory Tests
mx.0         - 336MUX Tests        (to select the first 16-port MUX)
xpc.5        - 336SIO XPC Tests
xpc.4        - 336SIO XPC Tests
xpc.3        - 336SIO XPC Tests
xpc.2        - 336SIO XPC Tests
xpc.1        - 336SIO XPC Tests
xpc.0        - 336SIO XPC Tests  (to select the first XPC connected to the first MUX)
```

The test selection menus for the gmem, xpc, and mx.0 tests and a brief
description of each test are shown below.

NOTE

If any of the gmem tests fail, the xpc and mx.0
tests will also fail.

```
SA: gmem <CR>    (to access the test selection menu for the global memory tests)

Selections for Test "336SIO Global Memory Tests"

    0) Zeros
    1) Ones
    5) 5555s
    a) AAAAs
    d) Address
```

Global Memory Tests

The gmem selections test all of the SIO board's global RAM, which is required for
XPC command, status, and data buffers.

0) **Zeros**
1) **Ones**
5) **5555s**
a) **AAAAs**

The RAM is written with a 0s, 1s, 5s, or As pattern and is then read and
verified for correct contents.

d) **Address**
   Writes all global RAM with a complementing address pattern and then
   verifies it.

SA: xpc.0 <CR>   *(to access the test selection menu for the first XPC on the SIO board)*

Selections for Test "336SIO XPC Tests"

   0) XPC DMA

XPC Tests

0) XPC DMA
   Fills the SIO board's global RAM with a pattern and commands the SIO
   board's XPC to read and write it to a cleared buffer in global RAM. The
   destination is compared against the source buffer.

   If this test fails, the Global RAM may be bad or the XPC's interface to Global
   RAM may be failing.

```
SA:  mx.0    (to access the MUX test selection menu)

Current Menu is /bdtest/336.0/mx.0 - "336MUX Tests"

p8.7              - 336MUX Ports 8-15 Tests
p8.6              - 336MUX Ports 8-15 Tests
p8.5              - 336MUX Ports 8-15 Tests
p8.4              - 336MUX Ports 8-15 Tests
p8.3              - 336MUX Ports 8-15 Tests
p8.2              - 336MUX Ports 8-15 Tests
p8.1              - 336MUX Ports 8-15 Tests
p8.0              - 336MUX Ports 8-15 Tests
p0.7              - 336MUX Ports 0-7 Tests
p0.6              - 336MUX Ports 0-7 Tests
p0.5              - 336MUX Ports 0-7 Tests
p0.4              - 336MUX Ports 0-7 Tests
p0.3              - 336MUX Ports 0-7 Tests
p0.2              - 336MUX Ports 0-7 Tests
p0.1              - 336MUX Ports 0-7 Tests
p0.0              - 336MUX Ports 0-7 Tests
```

SA: p0.0 *(to access the first MVME336MUX port)*

```
Selections for Test "336MUX Ports 0-7 Tests"
```
(The menu is the same for all 16 ports)

```
    c) Cluster Confidence
```
(Tests c, 0, and 1 do not require a loopback jumper plug)
```
    0) Internal Loopback
    1) Force Break
    2) External Loopback
```
(Tests 2, 3, 4, 5, o, 1, and ● require a loopback jumper plug)
```
    3) Force Framing Error
    4) Modem Status Change
    5) Force Parity Error
    r) Display ROM Revision
    s) Display Modem Status
    o) String Output to Device (Press the BREAK key to stop test o, 1, or ●)
    1) Endless Internal Loopback
    ●) Endless External Loopback
```

MUX Tests

c) **Cluster Confidence**

Requests the results of the power-on self test performed by the MUX ROM. If the MUX ROM passes all self tests except the UART test, then the results of the UART test display. The results show which port failed by setting the failing port's bit in a byte. The results are returned for the first eight ports (if the requesting port is between 0 and 7) or for the second eight ports (if the port is between 8 and 15).

COMMUNICATION CONTROLLER BOARD TESTS

1) **Force Break**
3) **Force Framing Error**
5) **Force Parity Error**
   These tests verify the detection logic.

0) **Internal Loopback**
2) **External Loopback**
1) **Endless Internal Loopback** *(Press the BREAK key to terminate)*
e) **Endless External Loopback** *(Press the BREAK key to terminate)*
   These tests fill a buffer with a pattern and send it to the port. When all data
   sent is received, the send and receive buffers are compared.

4) **Modem Status Change**
   Verifies that the CTS (clear to send), DSR (data set ready), and DCD (data
   carrier detect) signals can generate a change of status interrupt.

r) **Display ROM Revision**
   Displays the revision level of the MUX ROM, e.g., 1.0.

s) **Display Modem Status**
   Displays the level ON or OFF of the DSR, DCD, and RTS (request to send)
   signals from the requested port.

o) **String Output to Device** *(Press the BREAK key to terminate)*
   Sends a pattern to the port to verify output on a terminal. Like tests l and e,
   this is an endless test.

After a test is completed, the count of XPC retries from the MUX is requested. If
the retry count is greater than zero, it displays. (An XPC retry is considered a soft
or recoverable error condition.) An XPC retry may indicate that the condition of
the high speed link between the SIO and MUX is marginal.

All MUX tests start the XPC link before sending any commands to the MUX. If
the XPC cannot establish communications with the MUX after 90 seconds, a
link startup failed or **TIMED OUT** error occurs. This may be caused by
a bad link cable or bad SIO or MUX interface hardware.

MVME336 Board Test Configuration

The MVME336 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 336.0
/bdtest/336.0 configuration
   base [%0x40000] = 0xe00000          # base address
   level [1-7] = 3 ?                    # default interrupt level
   xpc [0-6] = 6 ?                      # number of X25 protocol controllers
   mx [0-6] = 1 ?                       # number of servers
> cf 336.0/xpc.0
/bdtest/336.0/xpc.0 configuration
   xpc [0-5] = 0 ?                      # X25 protocol controller
> cf 336.0/mx.0
/bdtest/336.0/mx.0 configuration
   xpc [0-5] = 0 ?                      # X25 protocol controller
   p0 [0-8] = 8 ?
   p8 [0-8] = 8 ?
```

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MVME374 Multi-Protocol Ethernet Interface Module

The MVME374 is taken over by the host processor via the following procedure:

1. The MVME374 tests are copied into the dual ported RAM.

2. The host loads a vector pointing to the tests in the MVME374 vector table.

3. The host loads a flag in the MVME374 control packet (CP).

4. The host interrupts the MVME374 by writing into the MVME374 IRAM.

5. When the test flag clears in the control packet, the MVME374 is ready for tests.

To access the test menus for the first MVME374 board, type:

> SA: 374.0

A display similar to the following appears:

```
Current Menu is /bdtest/374.0 - "VME374 Lan Controller Tests"

lan - VME374 Lan Tests

SA: lan <CR>   (to access the test selection menu)

Selections for Test - "VME374 Lan Tests"

   1) Run a,b,c,d,e,f,g,h,i,j,k,l
   2) Run a,b,c,d,e,f,g,h,i,j,k,l,x
   a) Check sum test nvram
   b) Check station address
   c) Lance register
   d) Lance internal loopback
   e) On board walking bit ram
   f) On board random ram
   g) Off board walking bit ram
   h) Off board random ram
   i) On board 374 down address ram
   j) On board 374 up address ram
   k) Bus arbitration test
   l) Irq test
   r) Reset 374
   x) Lance external loopback  (Connect MVME374 to Ethernet coax via a transceiver/tap.)

SA:
```

MVME374 Board Test Configuration

The MVME374 board test configuration is shown below. Refer to the **cf** command in Appendix A for information on modifying this configuration.

```
> cf 374.0
/bdtest/374.0 configuration
    base [%0x100] = 0xffd00000 ?              # base address
    signal_address = 0xffdfffc0 ?
    signal_type = 0x0 ?
```

MVME374 Error Codes

The following describes the MVME374 Error codes:

1	incorrect data
2	check sum error
3	timeout error
4	bus error
5	unexpected interrupt
6	status error
F0	level 7 autovector
F1	parity error (onboard 374)
F2	VMEbus error (onboard 374)
F3	local bus timeout (374)
FE	set-up error
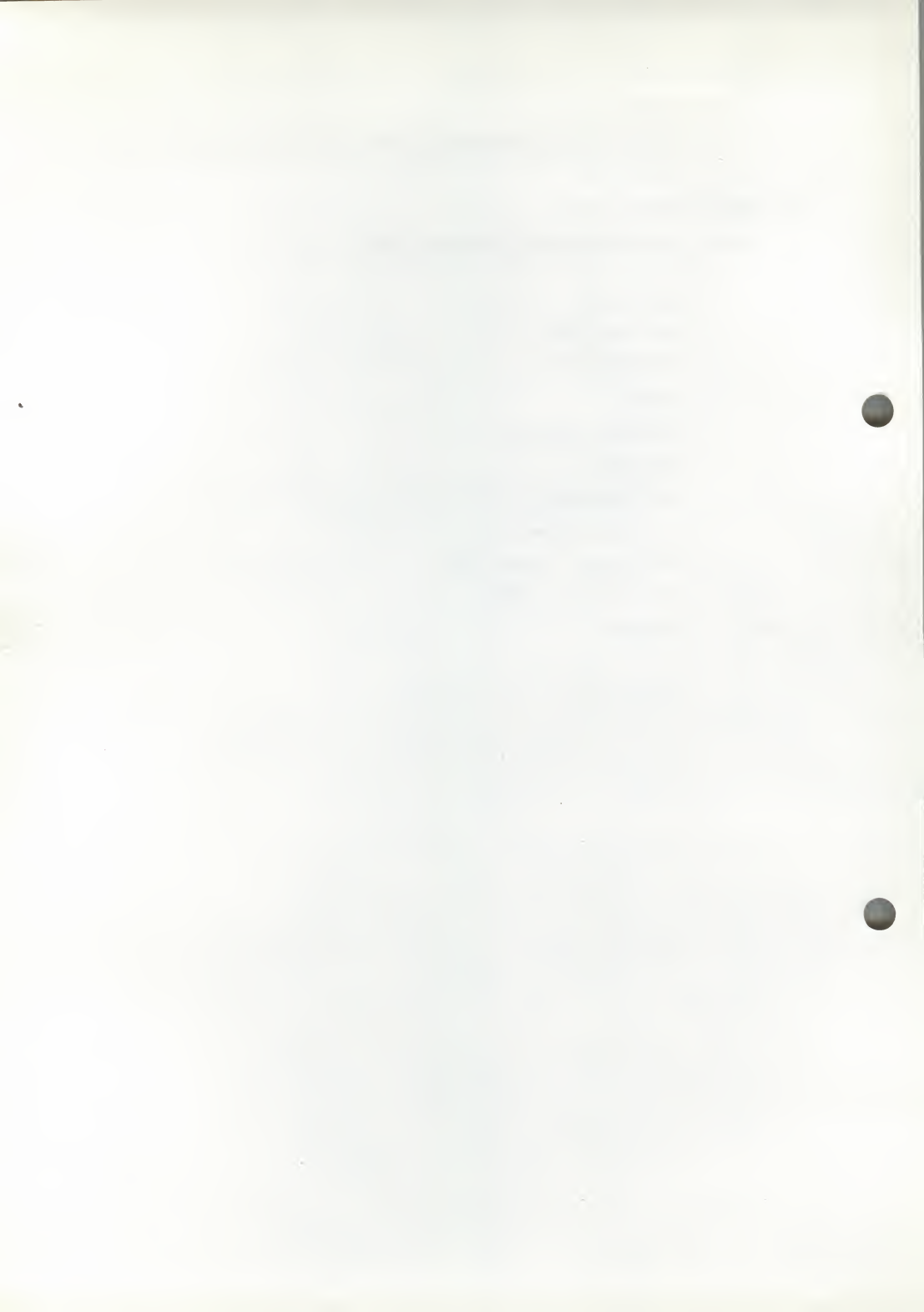
APPENDIX A
COMMAND LINE MODE

Command line mode is the testing environment on which the menu system is based. Designed for advanced users, command line mode offers many features not available within the menu system. In command line mode you can set test options directly on the command line, run a sequence of tests from different test menus, and configure the boards in the system.

To enter command line mode, type:

    SA: cmdline
    >

The **>** prompt indicates that you are in command line mode.

To run any of the SSID tests, simply type the name of the test and the test identifier(s). Typing the test name with no test identifier causes a preselected series of nondestructive tests to be run. To find out which test options are available for a given test, type the name of the test followed by a minus (–) sign.

EXAMPLES:

    > smd.1 0123 *(Run tests 0, 1, 2, and 3 on the second SMD disk drive.)*

    > 131.0 *(Run all preselected tests on the first MVME131 controller.)*

    > esdi.0 – *(List the test options available for the first MVME323 disk drive.)*

To return to menu mode, type:

    > set menu

    SA:

A

A-1

Command Line Format

Command line commands have the following format:

cmd [*args*] [<*input_dev*] [[*descriptor*]>*output_dev*] [*descriptor*>*descriptor*] [; *cmd* . . .]

Multiple command delimiter

Duplicate standard output descriptor

Redirect standard output descriptor to *output_dev*

Redirect standard input descriptor to get data from *input_dev*

ARGUMENT(S), separated by spaces or tabs; passed to *cmd* for optional selection

COMMAND, can be any executable node name found in the output of the **he** command
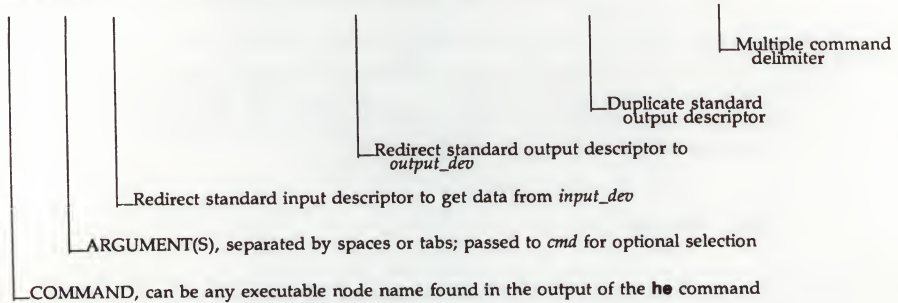
where:

[ ]	= optional field
. . .	= repeatable field
<	= input redirection
>	= output redirection
input_dev	= input device such as **sp0** (console port)
output_dev	= output device such as **pr** (printer) or **log** (logger)
descriptor	= device descriptor

Standard device descriptors:

0	= input descriptor (default for input redirection)
1	= output descriptor (default for output redirection)
2	= error output descriptor

After receiving a user's command, the command line monitor evaluates its format, opens the I/O devices if needed for redirection, builds a list of arguments, updates the system status, traverses through the directory tree if the command field is a directory node, and finally gives control to all test nodes under the command tree.

I/O Redirection

I/O redirection is a mechanism that allows the user to specify input and output devices on the command line. In a typical computer system, input comes from the terminal keyboard and output goes to the terminal screen. I/O redirection allows the user to change the source of input or the destination for output by specifying a new source and/or destination on the command line.

In SSID, output is sent to a logical device called standard output or error output, both of which default to the user's terminal screen. Typical output from a program is sent to standard output, while error messages are sent to error output. All input is taken from a logical device called standard input, which defaults to the user's terminal keyboard.

Standard output and error output can be redirected to another terminal, a printer attached to the MVME050 board, if installed, or the error logger. Error output can be sent independent of standard output or to the same destination. Standard input can be redirected from another terminal or the error logger. At the present time all tests may not adhere to the error output path for errors but rather send errors to standard output. A future release of SSID will correct this problem.

EXAMPLES:

1) Redirect standard output from the **he** command to the line printer:

   he > pr

2) Redirect standard input to come from the error logger:

   echo < log

3) Recalibrate the first winchester disk (test 1) and redirect the error output to the error logger:

   hd.0 1 2 > log

4) Set loop continuous, run the default tests on the first winchester disk, and store the error output in the error logger:

   set lc; hd.0   2 > log (*Note the semicolon separating the commands*)

5) Run the default tests on the first MVME332XT and redirect both standard output and error output to the printer:

   x332.0 > pr 2 > 1

   The first part of the command (**x332.0 > pr**) redirects the standard output to the printer. The second part (**2 > 1**) redirects error output (descriptor 2) to be the same destination as the standard output (descriptor 1), which is redirected to the printer in the first part of the command.

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NOTE

> If the MVME050 attached printer is under test, standard output and error output of the test cannot be redirected to the printer because they can interfere with the printer test. The printer test requires a special loopback cable connected to the printer port, but for test results to be printed out, connection to a printer is required.
>
> All references to the device **pr** refer to a printer connected via an MVME050 board.

Command Structures

To determine the tests available for a particular device, use the **he** (help) command, which displays the command directory tree. The tree structure allows you to concentrate on a particular test suite once the directory has been identified. Typing **he** *board_number* allows you to view the test suites associated with that board. Refer to the first two examples in the **he** command description later in this chapter.

When an executable node name, whether directory or test, is invoked as a command, every subnode under its tree structure is also a part of the command invocation. Thus, typing the following causes both **hd.0** and **fd.0** to be executed simultaneously or sequentially depending on how the system's environment is set up. Command line arguments are also passed to each subnode for as many levels as are constructed in the tree.

320.0

Arguments passed to the test module may allow specific subtest selection from the test module. The **hd.0** and **fd.0** subtest menus are obtained by using the following command:

he hd.0 fd.0

A display similar to the following appears:

```
bdtest/320.0/hd.0                       t--x    Winchester Disk
     0) Recalibrate
     1) Quick confidence read
     2) Read entire OS disk
     3) Random read OS disk
     4) Pingpong read OS disk
     d) Display OS bad tracks
bdtest/320.0/fd.0                       t--x    Floppy Disk
     0) Recalibrate
     1) Quick confidence read
     2) Read entire OS disk
     3) Random read disk
     4) Pingpong read disk
     p) Partial W/R DESTRUCTIVE
     w) Fully W/R DESTRUCTIVE
     f) Format Disk
```

The numbered subtest selections are the default test sequences that run if no test selection is specified. (This convention applies only when there are less than 11 default selections, i.e., 0 through 9.) For example, tests 0 through 4 run if command **hd.0** or **320.0** is invoked, but only test 2 runs if the command is **hd.0 2**. You can only invoke a subtest selection preceded by a letter by explicitly passing the selection letter as an argument to the test module from the command line. Test selections can be in any order and grouped into one or more arguments. You can enter multiple selections and repeat a selection any number of times. Each selection is executed in the order it appears on the command line.

EXAMPLES:

1) Run all default tests (0 through 4) on the first hard disk:

   hd.0 or **320.0**

2) Run several hard disk tests and several floppy disk tests:

   320.0/hd.0 23d ; 320.0/fd.0 4pw

3) Run the hard disk test 0 (Recalibrate) once, test 4 (Pingpong read OS disk) three times, and test 1 (Quick confidence read) and test 3 (Random read OS disk) twice:

   hd.0 0 444 1313

A-5

Test Progress Display

When a command is executed in command line mode, it performs a table look-up on its own test selection menu against its arguments. If the argument matches any entry in the table, it displays a banner including the command pathname, test description, and the word **starts** (See Figure A-1). It then calls the appropriate routine for the selection. Upon completion of the routine, it displays the previous banner but ends with the word **passed** or **failed**.

```
/bdtest/320.0/fd.0    0) Recalibrate              ....... starts
/bdtest/320.0/hd.0    0) Recalibrate              ....... starts
/bdtest/320.0/fd.0    0) Recalibrate              ....... passed
/bdtest/320.0/fd.0    2) Read entire OS disk      ....... starts
/bdtest/320.0/hd.0    0) Recalibrate              ....... passed
/bdtest/320.0/hd.0    1) Quick confidence read    ....... starts
/bdtest/320.0/fd.0    2) Read entire OS disk      ....... passed
/bdtest/320.0/hd.0    1) Quick confidence read    ....... passed
/bdtest/320.0/fd.0    3) Random read OS disk      ....... starts
/bdtest/320.0/hd.0    2) Read entire OS disk      ....... starts
/bdtest/320.0/fd.0    3) Random read OS disk      ....... passed
/bdtest/320.0/hd.0    2) Read entire OS disk      ....... passed
/bdtest/320.0/hd.0    3) Random read OS disk      ....... starts
/bdtest/320.0/fd.0    4) Pingpong read OS disk    ....... starts
/bdtest/320.0/fd.0    4) Pingpong read OS disk    ....... passed
/bdtest/320.0/hd.0    3) Random read OS disk      ....... passed
/bdtest/320.0/hd.0    4) Pingpong read OS disk    ....... starts
/bdtest/320.0/hd.0    4) Pingpong read OS disk    ....... passed
         pathname      selection      description                result
```

Figure A-1. Test Progress Display

Test Result Display

Figure A-1 illustrates a typical output of the successful completion of all subtests in the **320.0** test module. This output is sent to the standard output device, which is the user console if there is no I/O redirection on the command line.

SSID maintains fatal and nonfatal error counters for each node above the test nodes. For the directory structure shown in Figure A-2, counters are maintained for **hd.0**, **fd.0**, **320.0**, and **bdtest**. If an error occurs in any part of a test, the monitor updates the fatal and nonfatal error counters for each node above that test. Therefore, the total number of errors for the **320.0** node equals the number of errors in both the **fd.0** and **hd.0** tests, as illustrated in Figure A-2.

A-6
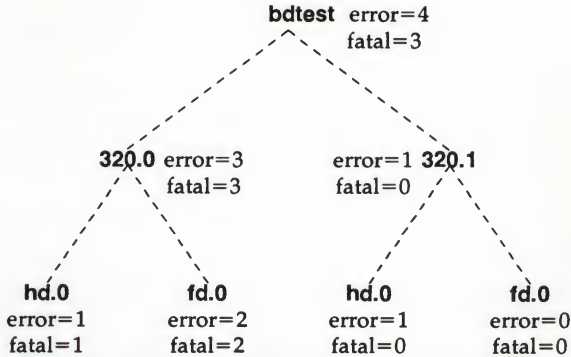
Figure A-2. Directory with Fatal and Nonfatal Error Counters

If the error is caused by bad return status from the MVME320, the entire ECA (or packet) data structure displays on the standard error device. Figure A-3 shows the typical output for such an error.

```
/bdtest/320.0/fd.0        3) Scan              ....... starts
|cmd|stat|ext |rtry|rcnt|dma|op|buf_addr|len |xfer|cyl |hd|sec|ccyl|
|03 | 01 |0008| 00 | 00 |00 |00|001f96b0|0400|0000|0006|00|0d |0006|
|n0|n1|n2|n3|n4|n5|s1|fill|type|surf|sec/trk|step|hst|hlt|seek|lwc |
|00|00|00|00|36|03|01| s5 | 05 | 02 | 10  | 0c |46 |46 | 00 |0028|
|prec|ecc0|ecc1|ecc2|sec0|sec1|sec2|wrk0|wrk1|wrk2|wrk3|wrk4|wrk5|
|0028|0000|0000|0000|0000|0000|0000|8888|8s8c|8480|0000|0000|0000|

error:  Nonrecoverable error, No identifier found.

/bdtest/320.0/fd.0        3) Scan              ....... failed
```

Figure A-3. Typical Error Display

If the error is caused by the data comparison, the output shows where the data mismatch occurred in the buffer, as illustrated in Figure A-4.

```
/bdtest/320.0/hd.0      3) Partial W/R         ....... starts
/bdtest/320.0/hd.0      At address=001aff00, expect=44, read=00
/bdtest/320.0/hd.0      3) Partial W/R         ....... failed
```

Figure A-4. Data Comparison Error

Along with all above messages, a system status message periodically displays on the system console, reporting pass-count, error-count, elapsed time, and test activity as illustrated in Figure A-5.

Note that this type of message only displays if SSID is operating in concurrent mode (default condition), and at least one test has been dispatched in the system. Also note that this message is only terminated by pressing <**CR**> without the **LINE FEED**. Therefore, it always stays at the same place on the screen. This preserves the previous information, and provides a clear picture of progress through the tests.

```
PASS=3, FATAL=0, ERROR=01   0:00:20.130   /bdtest/320.0/hd.0: running
```

Figure A-5. System Status Message

Finally, a composite status message displays at the completion of all tests to indicate the overall test results as illustrated in Figure A-6.

```
*** SYSTEM TEST PASSED ***
              or
*** SYSTEM TEST FAILED ***
```

Figure A-6. Composite Status Message

The error count message remaining on the screen reflects the results of the last test to complete; it is not a summary of all tests run.

Command Descriptions

Table A-1 summarizes the commands available in command line mode. Following the table, each command is explained in detail.

Table A-1. Command Line Mode Commands

COMMAND	DESCRIPTION
ce [*test*]	Clears error counters for the specified test. If no test is specified, all error counters are cleared. This command performs the same function as **clear** does in menu mode.
dml	Displays the actual detected installed memory (before allocations for SSID) for the system.
cf [*board*] [*test*]	Allows you to change the configuration of boards and tests recognized by SSID. **cf** with no option accesses the system level configuration (see Figure A-7).
echo *argument*	Echoes *argument* to the standard output. This command is similar to the operating system's **echo** command.
fe [*board*]	Finds errant test. **fe** displays the number of errors and fatal errors for all tests that have been run since reset or the last **ce** (or **clear** in menu mode) command. This command provides the same information as the **disperr** command available in menu mode.
he [*board*]	Displays the command structure of SSID. You can use the information given by **he** to bypass the SSID menus and initiate a test directly from the command line.
ml	Displays the memory free list in hexadecimal format. **ml** lists one line for each contiguous segment of memory.
reconf	Reconfigures test scripts for the **confld, fault, ptest,** and **ptestl** suites. Configuration information is taken from the system configuration list accessed by typing **cf** with no *option*.
set [±*option*]	Sets *option* for the test indicated on the command line. A preceding plus sign (+) or no prefix before *option* enables it; a preceding minus sign (–) disables *option*. Without *option*, **set** displays the current test options in command line mode.
set menu	Returns SSID to menu mode and the **SA:** prompt.

In addition, the system commands **disphrd, remote, help,** and **version** can be executed while in command line mode.

COMMAND LINE MODE

ce
Clear error counters

| Syntax |

> **ce** [*test*]

| Description |

ce clears the error counter for the specified test module. If no test module name is specified, all error counters are cleared. SSID maintains an error counter for each test module. These error counters are cleared at startup and may be cleared at other times by using **ce** (or **clear** in menu mode). No output is provided to confirm that the error counters have been cleared. Use **fe** (or **disperr** in menu mode) to confirm that errors have been cleared.

| Examples |

1) Clear all error counters:

> **ce**

2) Clear the error counter for the fd.0 test suite:

> **ce fd.0**

cf

Configure SSID

Syntax

cf [*board*] [*test*]

Description

cf allows you to change variables that control many aspects of SSID execution. These variables include quantity and selection of boards in the system configuration, type of peripherals available for test, base addresses, interrupt levels, address modifiers, and so on.

SSID has three levels of configuration variables: system, board, and test. **cf** with no option accesses the system level configuration; **cf** *board* accesses the board level configuration; and **cf** *test* accesses the test level configuration.

Configuration variables at all three levels are presented one line at a time. Lines containing configuration variables end with a question mark (?). Changes to configuration variables are entered following the question mark. Pressing <**CR**> leaves the current variable unchanged and displays the next line in the configuration. It is not possible to scroll up in a configuration display. If you pass over a line you wish to change, finish listing the display and invoke **cf** again.

The configuration displays show the range of legal values for each configuration variable and the current value. The default configuration is set up based on the hardware detected when SSID is booted. At startup, all configuration variables are initialized to default values. The default values are placed in a configuration file that may be changed to remove boards from the displays and (using **reconf**) the test suites. (Note you must execute **reconf** before exiting command line mode to affect test scripts.) Sometimes, the range of values in the menu may be further restricted by the hardware configuration. Refer to the hardware user's manual for each board or peripheral being configured to determine proper values.

System Configuration

The system level configuration display is similar to the screen below.

```
> cf
/bdtest configuration
        050  [0-1]  =  0  ?          #  number of MVME050
        13x  [0-1]  =  1  ?          #  number of MVME13x
        mem  [0-1]  =  1  ?          #  memory test enabled
        320  [0-2]  =  1  ?          #  number of MVME320
        321  [0-2]  =  0  ?          #  number of MVME321
        323  [0-2]  =  0  ?          #  number of MVME323
        G330 [0-1]  =  0  ?          #  number of MVME330GSP
        T330 [0-1]  =  0  ?          #  number of MVME330TCP
        331  [0-4]  =  0  ?          #  number of MVME331
        332  [0-4]  =  1  ?          #  number of MVME332
        x332 [0-16] =  1  ?          #  number of MVME332XT
        333  [0-4]  =  1  ?          #  number of MVME333
        335  [0-2]  =  1  ?          #  number of MVME335
        336  [0-1]  =  1  ?          #  number of MVME336
        350  [0-2]  =  1  ?          #  number of MVME350
        355  [0-1]  =  0  ?          #  number of MVME355
        360  [0-2]  =  1  ?          #  number of MVME360
>
```

Figure A-7. System Configuration List

You may alter the configuration to include a new board or to remove an existing board which you do not want to have tested. Refer to Example 1 below.

Board and Test Configuration

To display the configuration variables for a given board, type:

> **cf** *board.n*

where *n* is the number of the board in the series with **0** designating the first board. For example, **360.1** refers to the second MVME360 board.
To display the configuration variables for a given test, type:

> **cf** *test*

If a particular test is associated with more than one board in the system configuration, you may need to specify the board as well as the test (e.g., **cf 331.0/sp.0** to distinguish it from **332.0/sp.0**).

The acceptable range of input values is represented as:

0x   Hexadecimal. **0x100** is the hexadecimal number 100, or 256 in decimal. Numbers not preceded by **0x** are decimal.

%   Modulo. **%0x100** indicates that the value of a variable must be modulo 256 or 0x100.

–   Range. **0-7** represents any number in the range of 0 through 7.

b,w,l   Bus Width. **b** is byte, **w** is word, and **l** is longword.

NOTE

> You cannot configure a test until a board is configured to include that test; likewise, you cannot change a board configuration unless the system configuration includes that board.

| Examples |

1) Changing System Configuration

Make it possible to run the communication fault test only on the MVME332 board although the system has both an MVME332 and MVME333 board:

cf

```
/bdtest configuration
          355 [0-1] = 0 ? <CR>
          360 [0-2] = 1 ? <CR>
          350 [0-2] = 1 ? <CR>
          333 [0-4] = 1 ? 0 <CR>
          332 [0-4] = 1 ? <CR>
```
(Continue pressing the <CR> key until the > prompt reappears.)

Once the system configuration list has been changed, the test scripts for the **confid, fault, ptest**, and **ptesti** test suites must be reconfigured based on the new information. Refer to the following **reconf** command description.

2) Changing Default Drive Type

Change the default drive type for the first MVME320 from Micropolis to Toshiba:

cf 320.0 <CR>

```
/bdtest/320.0  configuration
    base [%0x400] = 0xffffb000 ? <CR>
    am[0x0d,0x3d] = 0x3d ? <CR>
    level [0-7] = 5 ? <CR>
    data bus width [b,w,l] = l ? <CR>
    type 0Micropolis 1Toshiba [0,1] = 0 ? 1 <CR>
```
                    (Type 1 to select a Toshiba drive.)
        (Continue pressing the <CR> kkey until the > prompt reappears.)

3) Selecting Address Increment Value for Memory Tests

Change the default address increment value for the memory tests from testing every longword to every fourth longword:

cf mem.0 <CR>

```
/bdtest/mem.0 configuration
     walk_step = 1 ? 4 <CR>
```

4) Changing Default Drive Size

Change the size of the first floppy disk drive from 655K to 1.2Mb:

> cf 320.0/fd.0 <CR>

```
/bdtest/320.0/fd.0 configuration
```
                (Only parameters requiring changes are shown here.)
```
     sector/xfer[1-16] = 16 ?   15 <CR>
     size(inch) [5,8] = 5 ? 8 <CR>
     no of sector/track = 16 ? 15 <CR>
     sector size[128,256,512] = 256 ? 512 <CR>
```

dml

Display detected memory list

| Syntax |

dml

| Description |

This command displays the actual detected installed memory for the system. Unlike the **ml** command, **dml**, probes memory before any allocations being made for SSID. Therefore, displays an accurate map of all memory installed in the system. Each block of contiguous space takes one line to display and all memory, contiguous or not, is represented.

| Examples |

Display detected memory:

```
dml

Total memory detected = 0x00400000, (4194304 bytes)

Seg     Start           End             Size
0       0x00000000      0x001fffff      0x00200000
1       0x00400000      0x005fffff      0x00200000
```

In this example, the total detected memory installed in the system is 4 megabytes, displayed in both hex and decimal. This is made up of two contiguous segments of memory as itemized:

- The first segment starts ad address 0, ends at address 1fffff and is 200000 bytes long.

- The second segment starts at address 400000, ends at address 5fffff and is also 200000 bytes long.

The gap between the end address of segment 0 (200000) and the start address of segment 1 (3fffff) constitutes a *hole* detected in the RAM address space.

A

COMMAND LINE MODE

echo

Echo message to standard output

Syntax

    echo [*argument*]

Description

This command echoes an argument to standard output. It is especially useful for examining the error log.

Examples

1)   Output a character string to the terminal:

    echo Good morning!

2)   Display the error log on the terminal by redirecting input from the error log:

    echo < log

A

fe

Find errant test

Syntax

fe [*test*]

Description

Like the **disperr** command in menu mode, **fe** displays the number of errors and fatal errors for all tests that have run since reset or the last **ce** (or **clear** in menu mode) command. If a test name is specified, only errors for that test and those under it display.

Examples

1) Display all errors:
   fe

```
/bdtest/320.0/fd.0        :error=1,  fatal=1
/bdtest/320.1/hd.0        :error=3,  fatal=1
/bdtest/320.1/hd.1        :error=5,  fatal=1
```

2) Display only errors from MVME320.0 tests:

   fe 320.0

```
/bdtest/320.0/fd.0        :error=1,  fatal=1
```

A

he

Online help

Syntax

> **he** [*test*]

Description

he displays a description of *test* and each subtest under it. If *test* is not specified, the entire SSID command structure, starting with root, displays.

The mode characters in the **he** display are interpreted as:

d = directory	**r** = read
t = test	**w** = write
D = device	**x** = executable

Use <^**s**> to stop the display from scrolling off the screen. Resume scrolling with <^**q**>.

Examples

1) Display the entire SSID command structure:

> **he**

```
/              d--- System monitor
    help       t--x   Using Diagnostics
    confid     d---   Confidence Testing
    .            .       .
    .            .       .
/bdtest        d--- Tests by Board
    131.0      t--x   VME131 68020 CPU Tests
    204.0      d--x   VME204 Computer System Memory Tests
    320.0      d--x   VME320 Disk Controller Tests
    .            .       .
    .            .       .
```

```
/bdtest/204.0  t--x VME204 Computer System Memory Tests
   mem.0       t--x   Memory Test
   .            .       .
   .            .       .
/cmdline       d--- Command Line Operations
   mcs/        d---   MCS options
   dv/         drw-   I/O devices
   opt/        d---   System options
/cmdline/mcs   d--- MCS options
   reconf      t--x   Reconfigure test scripts
   version     t--x   @(#)confile.src version date
   setopt      t--x   Set test options
   remote      t--x   Remote Diagnostic Link
   disphrd     t--x   display known hardware
/cmdline/dv    drw- I/O devices
   log         Drw-   logger
   sp1         Drw-   host port
   sp0         Drw-   console port
   pr          Drw-   printer 050
/cmdline/opt   d--- System Options
   he          t--x   help !!!!!!
   fe          t--x   find errant test
   cf          t--x   configure test
   ml          t--x   memory free list
   ce          t--x   clear error counters
   set         t--x   set variables
   echo        t--x   display msg
```

2) Display a test with descriptions of each subtest:

he 320.0

```
/bdtest/320.0     d--x    VME320 Disk Controller Tests
   hd.1           t--x      Winchester Disk
   hd.0           t--x      Winchester Disk
   fd.1           t--x      Floppy Disk
   fd.0           t--x      Floppy Disk
```

ml

Display memory free list

| Syntax |

    ml

| Description |

This command displays the current allocation of available memory under SSID. SSID dynamically allocates memory on an as-needed basis. Areas of available memory are not necessarily contiguous. The memory free list contains one line for each contiguous segment of memory. **head** is the starting memory location, and **size** is the number of bytes of contiguous memory starting at the head address.

| Example |

1) Display available memory:

    ml
        Free memory list
            head =   13150, size = e85bo
            head =   fb800, size = 400

In this example, the first segment starts at address **13150** and is **e85bo** bytes long; it thus ends with address **fb6ff**. The second segment starts at address **fb800** and is **400** bytes long; it thus ends with address **fbbff**. The memory between **fb700** and **fb800** (100 bytes) is currently allocated to some task within SSID.

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reconf

Reconfigure the menu mode test suites

Syntax

reconf

Description

The **reconf** command is used to reconfigure the **confid, fault, ptest**, and **ptesti** test suites to reflect changes made in the system configuration list (see Figure A-?). If **reconf** is not executed after changing the system configuration list, the test suites do not recognize the added or deleted board(s). The **bdtest** menus, on the other hand, automatically incorporate changes to the system configuration list.

Example

1) Reconfigure test scripts **confid, fault, ptest**, and **ptesti** to reflect a change in the system configuration list:

    reconf

A

set

Set environment options

Syntax

    set [±*option*]

Description

The **set** command is used to view or change the state of options that control the operation of SSID. When *option* is not specified, **set** displays the current status of the test options. When *option* is preceded by a plus sign (+) or nothing, it is enabled. When preceded by a minus sign (–), *option* is disabled.

In command line mode, the options **lc, le, ce** and **time** are volatile; that is, they must be set on the current command line, but they will return to their default values after processing of the command line is complete. The remaining values are non-volatile, holding their current values until changed by **set**.

Examples

1)   Display the current list of options:

    set

```
      lc - disabled loop-continue
      le - disabled loop-on-error
      li - disabled loop-on-intermittent-error
      vb - enabled verbose-mode
      ce - disabled continue-on-error
      ae - disabled display all errors
      dp - disabled display packet
     con - enabled concurrent-mode
    time - disabled execution-time
    menu - enabled prompt by menu
```

Refer to *The setopt Command* in Chapter 7 for an explanation of these options.

2) Enable the option **lc** to cause SSID to loop continuously in the **tp.0** test:

   set lc;tp.0

   When the test is complete, **lc** is again disabled.

3) Disable the verbose mode, enable the display of elapsed time, and run test 1 on the first Winchester disk drive:

   set -vb time;hd.0 1

NOTE

Option settings made using **set** are valid in command line mode only; option settings made using **setopt** are valid in menu mode only but do not affect the options used in the **confid/fault** and peripheral test scripts.

set menu

Return to menu mode

| Syntax |

    set menu

| Description |

set menu returns SSID to menu mode, displaying the last screen that was accessed before the **cmdline** command was executed. Menu mode provides confidence, fault, and peripheral test suites not available in command line mode.

| Example |

1) Exit command line mode:

    set menu
    SA:

GLOSSARY

board testing	Testing that verifies operation of a specific board in the system. Board testing is valuable whenever a board is replaced (refer to Chapter 5).
ce	A command line mode command that clears error counters for the specified test. If no test is specified, all error counters are cleared. This command performs the same function as **clear** does in menu mode.
cf	A command line mode command that allows you to change the configuration of boards and tests recognized by SSID. **cf** with no option accesses the system level configuration (see Figure A-1). Refer to Appendix A for details.
clear	A system command that clears all error logs and pass counters. Refer to *The clear Command* in Chapter 7 for details.
cmdline	A system command that accesses command line mode. Command line mode offers features not available in menu mode, such as the capability to change configuration variables, reconfigure test suites, and list the entire SSID command structure.

NOTE

Command line mode is reserved for advanced users of SSID. Refer to Appendix A for details.

command packet	A set of parameters sent to a board or module to cause it to execute a specific command. A command packet might contain a command to read data, the code for the device to read data from, and the amount of data to read.
command review block	The upper portion of SSID menus that serves as a reminder of the SSID commands you can select when not testing.
concurrent testing	Testing that allows tests to run together, using time slicing for maximum use of the CPU for each test.

confidence testing	Testing that verifies total system health by running a dynamically configured suite of tests; it is useful at initial system installation and after a major system component replacement. Refer to Chapter 3.
destructive test	A test that modifies the data stored on a storage device attached to a board. Do no do destructive testing on a disk until you have backed up the data or the disk drive replaced.
diagnostic	A kind of test that probes a device that has failed a go/no-go test to find the cause of the failure.
disperr	*(display error)* A system command that lists the accumulated errors and the pass count. If no errors occurred, only the pass count is shown. Refer to *The disperr Command* in Chapter 7 for details.
dphrd	*(display hardware)* A system command that displays the boards whose presence is sensed by SSID. (If a board is completely dead it may not be recognized.) Refer to *The disphrd Command* in Chapter 7 for details.
dml	A command line mode command that displays the actual installed memory for the system. Refer to Appendix A for details.
echo	A command line mode command that echoes a given argument to the standard output. This command is similar to the operating system's **echo** command. Refer to Appendix A for details.
fault isolation	The process of eliminating conditions and hardware components until the failing part and the test that causes the failure are identified.
fault testing	Testing that checks and diagnoses specific system failures by running a dynamically configured suite of tests.
fe	A command line mode command that finds errant tests. **fe** displays the number of errors and fatal errors for all tests that have run since reset or the last **ce** (or **clear** in menu mode) command. This command provides the same information as the **disperr** command available in menu mode. Refer to Appendix A for details.

hard error	Also known as fatal error, an error that is repeatable and cannot be corrected. Hard errors include nonexistent controller or device, illegal command, media not in place, or soft errors for which the retry count has been reached.
he	A command line mode command that displays the command structure of SSID. You can use the information given by **he** to bypass the SSID menus and initiate a test directly from the command line. Refer to Appendix A for details.
help	A system command that accesses the **help** program. Once in the **help** program, you can access online information concerning SSID operations, tests, and test suites. Refer to *The help Command* in Chapter 7 for details.
interference	In SSID, interference refers to situations in which the activity of one board causes failures in another board. Sometimes failures occur only if the interfering board is running a specific test. However, just the presence of the interfering board in the system may be sufficient in other cases. In certain circumstances, the presence of a module may even hide a failure in another module or cause multiple problems to show up at the same time.
intermittent failure	A failure that occurs at random rather than in a predictable pattern. The time between failures may be a few seconds or a few days.
ml	A command mode command that displays the memory free list. **ml** lists one line for each contiguous segment of memory. Refer to Appendix A for details.
non-destructive test	A test that does not modify the data on a storage device attached to a board. It is not necessary to back up data contained on a device undergoing non-destructive testing.
peripheral testing	Testing that checks and diagnoses disk drives and tape devices attached to the system by running a dynamically configured suite of tests.
reconf	A command mode command that reconfigures test scripts for the **confid**, **fault**, **ptest**, and **ptesti** suites. Refer to Appendix A for details.

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remote	A system command that allows connection to a remote terminal connected to a modem or to a remote terminal on port 2 of the MVME707. Once connected to the remote site, all keyboard and display functions are in parallel. All SSID functions can then be performed from the remote site. Refer to *The remote Command* in Chapter 7 for details.
set	A command line mode command that displays current test options, and sets test options directly on the command line. Refer to Appendix A for details.
set menu	A command line mode command that returns SSID to menu mode and the SA: prompt. Refer to Appendix A for details.
setopt	A system command that allows you to enable or disable test options such as loop-on-error, verbose mode, and concurrent mode. Refer to *The setopt Command* in Chapter 7 for details.
soft error	Also known as non-fatal error, an error that may not occur again if the same operation is repeated. If the configured number of soft error retries is performed without getting correct data, then a hard (fatal) error has occurred.
test	A program that determines whether or not a device is performing correctly by subjecting it to go/no-go situations.
version	A system command that displays the current revision data for SSID. Refer to *The version Command* in Chapter 7 for details.
view	A system command that displays the individual board tests making up any confidence, fault, or peripheral suite. Refer to *The view Command* in Chapter 7 for details.

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